General programme

Time		Events		
Sunday 18 May	**morning**	Workshop 1	Workshop 2	Workshop 6
	afternoon			
Monday 19 May	**morning**	Session 1.1	Session 4.2	
	afternoon			
	evening	Welcome reception		
Tuesday 20 May	**morning**	Session 1.2	Session 2.1	
	afternoon			
	evening	Wine and tapas poster session		
Wednesday 21 May	**morning**	Session 2.2	Session 5.1	Workshop 4
	afternoon	Free afternoon - sightseeing trips		
	evening	Informal dinner		
Thursday 22 May	**morning**	Session 4.1	Session 3.1	
	afternoon			
	evening	Wine and tapas poster session		
Friday 23 June	**morning**	Session 3.2	Session 5.2	
	afternoon			
	evening	Extravaganza dinner		

S1.1 Observed climate changes

S1.2 Climate model projections

S2.1 Marine carbon cycling and other biogeochemical cycles

S2.2 Ocean acidification and coral reef bleaching

S3.1 Natural hazards, sea level rise and coastal erosion

S3.2 Estuarine and wetland ecosystem functioning

S4.1 Impacts on lower trophic levels

S4.2 Impacts on higher trophic levels

S5.1 Scenarios for polar, mid-latitude, sub-tropical, and tropical environments and ecosystems

S5.2 Adaptation and mitigation of impacts on the marine environment and ecosystems

W1 Zooplankton and climate: response modes and linkages among regions, regimes, and trophic levels

W2/3 Linking global climate model output to (a) trends in commercial species productivity and (b) changes in broader biological communities in the World's oceans

W4 Prospects for multidisciplinary long-term ocean observations

W6 Storm surges and flooding in the Baltic Sea

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Theme 1. Past and future variability and change in ocean climate

Dramatic changes have been observed in the circulation and physical characteristics of the oceans over the past century. These changes are projected to continue over the next century based on the analyses and summaries recently presented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). In this topic, we solicited presentations that address past and future climate variability and change in the ocean, and the role that the ocean plays in these changes. Papers related to changes in forcing mechanisms such as wind fields, air-sea heat exchange, the freshwater budget, and the impact that changes in these forcing fields have had, and will have, on ocean circulation, large-scale sea level, heat and freshwater content and transport, ventilation and upwelling, sea-ice, and surface waves were welcomed. Presentations using: i) analyses of global and regional data sets arising from observations alone and/or state estimation; ii) idealised and conceptual models of observed climate change; iii) analyses of global climate models projections or results from higher-resolution regional ocean, or coupled atmosphere-ocean, models that are forced by, and take their boundary conditions from, global climate models; iv) uncertainties in model projections and how they might be improved; and v) the ability of models to predict abrupt change and extreme events, were encouraged.

S1.1 Observed climate changes

Convenors: *Lynne D. Talley (Scripps Institution of Oceanography, San Diego, USA)*
Martin Visbeck (IFM-GEOMAR, Germany)

Invited speakers: *Nathan Bindoff (University of Tasmania, Australia)*
Ruth Curry (Woods Hole Oceanographic Institution, USA)

This session will present observations of climate change in the ocean's physical characteristics, including circulation, water mass properties (heat, salinity, and tracers of water masses), sea level and surface waves; and change in the associated forcings, such as winds, air-sea heat flux, freshwater flux and sea-ice. Papers are encouraged that describe emerging methodologies for observing and quantifying ocean climate change, including new observing networks and state estimation. Model studies that explore the causes of observed climate change in the ocean are also welcome.

Monday 19 May 2008 09:15 - 18:15

09:15 **Lynne D. Talley**
Observed ocean climate changes: a review based on the IPCC AR4 and subsequent works (S1.1-4947 Plenary)

10:45 ***Tea/coffee break***

11:15 Introduction by Convenors

11:20 **Ruth Curry**
Evolution of Atlantic Ocean properties and circulation from the tropics to the Arctic (S1.1-4813 Invited)

11:45 **Martin Visbeck, Jürgen Fischer, Rainer Zantopp, Lothar Stramma, Peter Brandt and Friedrich Schott**
Is the Atlantic thermohaline circulation slowing? Results from Deep Western Boundary Current observations at the exit of the Labrador Sea (S1.1-4891)

12:10 **Eugene B. Colbourne, K.F. Drinkwater, H. Loeng and S. Sundby**
Ocean climate variability in the North Atlantic: the importance of large-scale atmospheric forcing (S1.1-4725)

12:25 **Cesar M. González-Pola, Alicia Lavín, José Luis López-Jurado, Carmen Rodriguez, Raquel Somavilla, Manuel Ruiz-Villareal, Guillermo Díaz del Rio and Ricardo Sánchez**
The recent warming of intermediate waters at the eastern North Atlantic: insights from a monthly hydrographical time series in the Bay of Biscay (S1.1-4840)

12:40 **N. Penny Holliday, S.L. Hughes, S. Bacon, A. Beszczynska-Möller, B. Hansen, A. Lavín, H. Loeng, K.A. Mork, S. Østerhus, T. Sherwin and W. Walczowski**
Reversal of the 1960s-1990s freshening trend in the upper ocean of the north-east North Atlantic and Nordic Seas (S1.1-4750)

12:55 **Julio M. Morell, Julian Morell and Jorge E. Corredor**
Responsiveness of water mass properties to climate forcing at the Caribbean Time series station in the northeastern Caribbean basin (S1.1-4731)

13:10 ***Lunch***

14:30 **Matthew H. England and Willem P. Sijp**
Southern hemisphere westerly wind control over the ocean's thermohaline circulation (S1.1-4951)

14:45 **Douglas G. Martinson**
Increased ocean heat along the continental margin of west Antarctica (S1.1-4759)

15:00

15:15 **Claus W. Böning, Astrid Dispert, Martin Visbeck and Franziska Schwarzkopf**
Multi-decadal warming and freshening of the Antarctic Circumpolar Current (S1.1-4899)

15:30 **Ming Feng, Arne Biastoch, Claus W. Böning, Nick Caputi and Gary Meyers**
Variability and trend of the heat balance in the southeast Indian Ocean (S1.1-4827)

15:45 **Hyacinth C. Nnamchi and Raymond N.C. Anyadike**
Rainfall variations and trends along the coast of the Gulf of Guinea (S1.1-4562)

16:00 ***Tea/coffee break***

16:30 **Nathaniel L. Bindoff Kieran P. Helm and John A. Church**
Global changes of the hydrological cycle and ocean renewal inferred from ocean salinity, temperature and oxygen data (S1.1-4863 Invited)

17:00 **Skip McKinnell and Nate Mantua**
A high resolution Pacific Decadal Oscillation and some of its novel characteristics (S1.1-4709)

17:15 **Steven J. Bograd and Carmen G. Castro**
The shoaling of the oxygen minimum layer in the California Current (S1.1-4884)

17:30 **Igor A. Zhabin and Svetlana N. Taranova**
Influence of rapid regional climate warming on the water mass formation in the Japan/East Sea (S1.1-4543)

17:45 **Chikka Kalyani Devasena**
Upper ocean variability in the equatorial Indian Ocean and the influence of monsoon circulation (S1.1-4640)

18:00 **Gaël Alory and Gary Meyers**
Warming of the upper equatorial Indian Ocean and changes in the heat budget (1960-2000) (S1.1-4528)

S1.1 Posters

S1.1-4538 **Artem A. Sarafanov, Alexey V. Sokov and Anastasia S. Falina**
Warming and salinification of intermediate and deep waters in the Irminger Sea and Iceland Basin in 1997-2006

S1.1-4566 **Simón Ruiz, Damià Gomis, Marcos G. Sotillo and Simon A. Josey**
Seasonal and interannual heat fluxes variability in the Mediterranean Sea from a 44-year high-resolution atmospheric data set

S1.1-4572 **U.K. Singh and P.S. Salvekar**
Large scale circulation over the west Indian Ocean and the south west monsoon

S1.1-4583 **Marcos Llope and Ricardo Anadón**
Sea surface warming in the southern Bay of Biscay modulated by oceanic advection

S1.1-4600 **Enrique Vidal-Vijande, A. Pascual, D. Gomis, B. Barnier and J. Tintoré**
Analysis of a 44-year hindcast for the Mediterranean Sea: comparison with altimetry and climatology

S1.1-4606 **Shusaku Sugimoto and Kimio Hanawa**
Decadal and interdecadal variations of the Aleutian Low activity and their relation to atmospheric teleconnection patterns

S1.1-4607 **Maite de Castro, Moncho Gómez- Gesteira, Inés Álvarez, María N. Lorenzo, José L.G. Gesteira and Alejandro J.C. Crespo**
Spatio-temporal upwelling trends along the Canary Upwelling System (1967-2006)

S1.1-4609 **Olanrewaju B. Oyewole**
Establishing research objectives to address issues of climate-change

S1.1-4610 **José Quereda Sala, Enrique Montón Chiva and José Escrig Barberá**
A "trojan" in climatic change: the urban effect

S1.1-4616 **Raquel Niclòs, María J. Estrela, Jose A. Valiente, Vicente Caselles and César Coll**
A new satellite algorithm for an accurate determination of the sea surface temperature for climate and meteorological studies

S1.1-4627 **Sergey K. Gulev**
Reconstruction of interdecadal variability of air-sea interaction in the Atlantic 1880-2004

S1.1-4635 **Torbjørn Lorentzen**
Global warming - stationarity in sea temperature data

S1.1-4638 **Roman Yu. Tarakanov**
Geostrophic currents variability in the Drake Passage

S1.1-4652 **Hyacinth C. Nnamchi and Raymond N.C. Anyadike**
Rainfall variations and trends along the coast of the Gulf of Guinea

S1.1-4657 **Vladimir I. Ponomarev and Elena V. Dmitrieva**
Climatic tendencies and changing global-regional linkages in the North Pacific SST

S1.1-4680 **Aránzazu Lana, Sergio Vallina and Rafel Simó**
Atmospheric variables potentially affected by DMS

S1.1-4687 **Fernando González and Ricardo Anadón**
Decoupling of sea surface temperature variation during the last two decades and its effect on remotely sensed phytoplankton biomass in the North Atlantic

S1.1-4712 **Nina I. Savelieva, E.V. Dmitrieva and V.I. Ponomarev**
Climatic oscillations in the Asian Pacific in terms of cluster analyses of aggregated observation data

S1.1-4715 **Irina V. Sakova, Gary Meyers, Nerilie J. Abram and Richard Coleman**
Analysis of the 18-month variability in the Indian Ocean based on historical data and proxy climate records

S1.1-4729 **Vladislav E. Tymofeiev**
ENSO and climate change in the West Antarctic Sector

S1.1-4730 **Philip C. Reid and Astrid C. Fischer**
The impact of the oceans on climate change

S1.1-4752 **Jan Aure, Didrik S. Danielssen and Einar Svendsen**
Climatic changes in the deep Norwegian coastal waters and Skagerrak 2000 - 2005 in relation to previous decades

S1.1-4762 **Simon A. Josey, Jeremy P. Grist, Robert Marsh and Bablu Sinha**
Impacts of air-sea flux variability on the mid-high latitude North Atlantic Ocean

S1.1-4769 **Manuel González, Luis Ferrer, Almudena Fontán, Julien Mader, Adolfo Uriarte and Ganix Esnaola**
Trend analysis of sea surface temperature at the aquarium of Donostia-San Sebastián (1946-2007)

S1.1-4776 **Anna I. Ginzburg, Andrey G. Kostianoy and Nickolay A. Sheremet**
Long-term variability of sea surface temperature in the Black and Marmara seas and its response to global atmospheric forcing

S1.1-4792 **Heather Cannaby, G. Nolan, I. Nardello, G. Westbrook and K. Lyons**
Analysis of an Irish coastal sea temperature time series: interannual variability and sensitivity to global influence (1958-2007)

S1.1-4801 **Alexander N. Demidov, Sergey A. Dobrolyubov, Roman Yu. Tarakanov and Artem A. Sarafanov**
Recent intra-decadal changes in the water mass temperature, salinity and transport in the 60°N transatlantic section

S1.1-4812 **Gema Martínez-Méndez, Rainer Zahn, Ian R. Hall, Frank Peeters, Leopoldo D. Pena and Isabel Cacho**
Palaeoceanography of the Agulhas current and ensuing Indian-Atlantic water exchange as a leading component of Atlantic MOC shifts

S1.1-4823 **Olga O. Trusenkova**
Variability and forcing of the subarctic front in the northwestern Japan/East Sea

S1.1-4849 **Tiziana Peluso, Giorgio Budillon, Giannetta Fusco and Daniele Iudicone**
Mixed layer variability and its relation to ice cover and distribution of chlorophyll ***a*** in the Weddell Sea (Southern Ocean)

S1.1-4878 **Anastasia S. Falina, Artem A. Sarafanov, Alexey V. Sokov and Alexander N. Demidov**
Warming and salinification of intermediate waters of southern origin in the eastern subpolar North Atlantic in the 1990s – mid-2000s

S1.1-4894 **Belén Rodríguez-Fonseca, Irene Polo, Javier García-Serrano and Carlos R. Mechoso**
Recent trends in the tropical Pacific-Atlantic connection

S1.1-4898 **Vadim Navrotsky**
Effects of the world's oceans on climate change

S1.1-4911 **Eva Calvo, Carles Pelejero, Leopoldo D. Pena and Isabel Cacho**
Eastern equatorial Pacific climate variability for the last glacial cycle

S1.1-4915 **Sarah L. Hughes and members of the ICES Working Group on Oceanic Hydrography**
Comparison of *in situ* time series of temperature with gridded sea-surface temperature data sets in the North Atlantic

S1.1-4916 **Verónica M. Benítez-Barrios, Alonso Hernández-Guerra, Pedro J. Vélez-Belchí, Francisco J. Machín and Eugenio Fraile-Nuez**
Recent changes in temperature and salinity in the Canary region

S1.1-4948 **Archibong O. Ediang, L.E. Edaefinene and A.A. Ediang**
The teleconnection between sea surface temperature analysis from ***in situ*** data at East Mole, Lagos and global warming

S1.1-4957 **Larissa A. Gayko**
Variations of water and air temperature in coastal areas of the north-west Japan/East Sea

S1.1-4963 **Oscar Pizarro**
Low-frequency changes in sea surface temperature in the eastern South Pacific

S1.1-4979 **Thamer B. Al-Rashidi, Carl L. Amos, Hamdy I. El-Gamily and Karim A. Rakha**
Effects of regional drivers on the sea water temperature in Kuwait Bay, northern Arabian Gulf

S1.2 Climate model projections

Convenors: *Michael G. Foreman (Institute of Ocean Sciences, Fisheries and Oceans, Canada)*
Richard Wood (Hadley Centre for Climate Prediction and Research, UK)

Invited speakers: *Seita Emori (Center for Global Environmental Research, National Institute for Environmental Studies, Japan)*
Hans von Storch (Institute for Coastal Research, GKSS Research Center, Germany)

This session will extend the observational evidence of oceanic climate change and variability described in Theme 1.1 to future projections. Presentations that summarise or analyse oceanographic characteristics or features simulated by global climate models, as well as those that downscale (statistically or dynamically) results from these models to specific regions, were encouraged. Though the focus is on change and variability in large scale physical variables, processes, and patterns, talks that draw links to biogeochemistry and impacts were also welcomed.

Tuesday 20 May 2008 08:30 - 16:45

08:30 **Ronald J. Stouffer**
Oceans role in climate change (S1.2-4702 Plenary)

10:00 ***Tea/coffee break***

10:30 **Hans von Storch, Eduardo Zorita and Fidel J. González-Rouco**
Comparing past variability of coastal currents and upwelling regimes with plausible future anthropogenic signals – in the framework of millennial AOGCM simulations (S1.2-4802)

10:55 **Seita Emori**
Future projection of extreme events (S1.2-4955 Invited)

11:20 **Markus Scheinert, Claus W. Böning and Arne Biastoch**
Freshening of the subpolar North Atlantic: causes and consequences (S1.2-4839)

11:35 **Nicholas A. Bond, James E. Overland and Muyin Wang**
A method for using IPCC model simulations to project changes in marine ecosystems (S1.2-4622)

11:50 **Robert Marsh, Beverly A. de Cuevas, Andrew C. Coward and Simon A. Josey**
Recent warming and changes of circulation in the North Atlantic simulated with eddy-permitting and eddy-resolving ocean models (S1.2-4766)

12:05 **Talgat R. Kilmatov and Vera A. Petrova**
A variational model of jet current applied to the Kuroshio Extension (S1.2-4642)

12:20 **John C. Fyfe and Oleg A. Saenko**
Anthropogenic speed-up of oceanic planetary waves (S1.2-4697)

12:35 **Alexander Sen Gupta, Agus Santoso, Andrea Taschetto, Caroline Ummenhofer and Matthew H. England**
Fidelity in the present-day simulation and projected changes to the southern hemisphere extratropical ocean/sea-ice system in the AR4 coupled climate models (S1.2-4714)

12:50 **Didier Swingedouw, T. Fichefet, P. Huybrechts, H. Goosse, E. Driesschaert and M.-F. Loutre**
Antarctic ice-sheet melting provides negative feedbacks on future climate warming (S1.2-4603)

13:05 ***Lunch***

14:30 **Jason Holt, Sarah Wakelin, Graham Tattersall, Roger Proctor, Icarus Allen, Jerry Blackford, Tim Smyth, Jason A. Lowe, Mark Gallani and Mike Ashworth**
The sensitivity of the circulation, stratification and primary production of the northwest European continental shelf to climate change (S1.2-4667)

14:45 **Francisco Álvarez-García, William Cabos-Narváez and María J. Ortiz-Beviá**
The Atlantic Multidecadal Oscillation in IPCC coupled model control and climate change simulations (S1.2-4691)

15:00 **Marisa Montoya and Anders Levermann**
Surface wind-stress threshold for glacial Atlantic overturning (S1.2-4807)

15:15 **Pablo Ortega, Marisa Montoya and Fidel J. González-Rouco**
The AMOC in millennial ECHO-g climate simulations and future climate change scenarios (S1.2-4809)

15:30 **Paulo Nobre, Emanuel Giarolla, Domingos Urbano, Roberto de Almeida and Marta Malagutti**
Biosphere-atmosphere-ocean interactions and climate change: the case of Amazon deforestation (S1.2-4695)

15:45 **Maria Nieves Lorenzo, Isabel Iglesias and Juan Jose Taboada**
Influence of coloured noise in the ocean coupling on the thermohaline circulation (S1.2-4598)

16:00 **William J. Merryfield, Badal Pal and Michael.G. Foreman**
Future winds off the Pacific coast of Canada (S1.2-4579)

16:15 **Richard E. Thomson and Isaac V. Fine**
A diagnostic model of mixed layer depth variability with application to Ocean Station "P" in the northeast Pacific (S1.2-4855)

16:30 **Enrique E. Aguirre**
Study of the wind variation effects in the upwelling system along the Peruvian coast and consequences of climate change through numerical modelling (S1.2-4745)

S1.2 Posters

S1.2-4539 **Rodrigo Kerr, Ilana Wainer and Mauricio M. Mata**
Representation of the Weddell Sea deep water masses in the ocean component of the NCAR-CCSM model

S1.2-4808 **Pablo Ortega, Fidel J. González-Rouco, Marisa Montoya and Hugo Beltrami**
Heat content through the last millennium and in future climate change scenarios: an assessment using ECHO-g AOGCM simulations

S1.2-4889 **Huaming Yu, Xianwen Bao and Xueen Chen**
A global ocean current and tidal model with varying unstructured grids: application to the East China Shelf

Theme 2. Interactions between climate variability and change and biogeochemical cycles

Carbon dioxide is one of the most important "green-house" gases in the atmosphere affecting the heat balance of the earth. As a direct result of the industrial and agricultural activities of humans over the past two centuries, atmospheric CO_2 concentrations have increased by about 100 ppm. The atmospheric concentration of CO_2 is now higher than experienced on Earth for at least the last 650,000 years, and is expected to continue to rise, leading to significant temperature and CO_2 increases in the atmosphere and oceans by the end of this century. The ocean carbon cycle is closely linked to climate because the oceanic uptake of anthropogenic CO_2 helps to regulate atmospheric CO_2 and, furthermore, the rate of uptake of CO_2 is affected by climate-induced changes in biogeochemical and physical processes in the oceans.

S2.1 Marine carbon cycling and other biogeochemical cycles

Convenors: *Corinne Le Quere (British Antarctic Survey, UK)*
Jorge L. Sarmiento (Princeton University, USA)

Invited speakers: *Christopher L. Sabine (Pacific Marine Environmental Laboratory, NOAA, USA)*
Andrew J. Watson (University of East Anglia, UK)

Global surveys over the past several decades now allow scientists to examine decadal time-scale variations in ocean biogeochemical processes in unprecedented detail. This session invites observational and modelling papers that describe these changes from many different angles, including physical, biological, biogeochemical and carbon cycle perspectives. Emphasis is placed on decadal changes in carbon cycling, e.g. anthropogenic carbon, air-sea exchange of carbon dioxide, the biological pump, nutrient and oxygen cycling, impacts of increasing levels of carbon dioxide on carbonate chemistry, and changes in the distribution of natural carbon in mode and deep waters. Contributions that make use of a broad palette of interdisciplinary tools were encouraged.

Tuesday 20 May 2008 09:15 - 17:00

09:15 **Corinne Le Quéré, Taro Takahashi, Christian Rödenbeck, Erik T. Buitenhuis and Steward C. Sutherland**
Recent trend in the global oceanic CO_2 sink (S2.1-4797 Plenary)

10:00 ***Tea/coffee break***

10:35 **Christopher L. Sabine, Richard A. Feely, Frank J. Millero, Andrew G. Dickson, Rik Wanninkhof, Dana Greeley and Esa Peltola**
Decadal changes in the Atlantic, Pacific and Indian Ocean inorganic carbon inventories (S2.1-4817 Invited)

11:00 **Andrew J. Watson, P.J. Brown and U. Schuster**
The changing uptake of CO_2 by the North Atlantic Ocean (S2.1-4954 Invited)

11:25 **Nicolas Metzl and Andrew Lenton**
What can surface fCO_2 measurements tell us about the evolution of the Southern Ocean CO_2 sink? (S2.1-4670)

11:40 **Kirsten Zickfeld, John C. Fyfe, Michael Eby and Andrew J. Weaver**
Negative feedback of poleward intensifying southern hemisphere winds on atmospheric CO_2 in the 21st century (S2.1-4701)

11:55 **Andrew Lenton, Laurent Bopp Francis Codron, Nicolas Metzl and Patricia Cadule**
The combined effects of rising atmospheric CO_2 and declining stratospheric ozone on the past and future uptake of CO_2 by the Southern Ocean (S2.1-4708)

12:10 **Claire Lo Monaco, Andrew Lenton, Nicolas Metzl and Keith B. Rodgers**
Natural and anthropogenic carbon changes in mode waters of the south west Indian Ocean (S2.1-4854)

12:25 **Galen A. McKinley, David Ullman, Val Bennington, Stephanie Dutkiewicz and Nicolas R. Bates**
Advective impacts on North Atlantic carbon sink variability (S2.1-4861)

12:40 **Keith B. Rodgers, Anand Gnanadesikan, Robert Key and Jorge L. Sarmiento**
Altimetry helps to explain patchy changes in repeat hydrography carbon measurements (S2.1-4928)

12:55 **Jill A. Peloquin, Zouhair Lachkar and Nicolas P. Gruber**
Understanding the impact of physical forcing on Southern Ocean phytoplankton and primary production (S2.1-4832)

13:10 ***Tea/coffee break***

14:30 **Michio Aoyama, M. Fukasawa, T. Kawano, S. Kouketsu, Y. Kumamoto, A. Murata, K. Sato and H. Uchida**
An increase of silicic acid and nitrate concentrations along the pathway of Lower Circumpolar Deep Water in the Pacific Ocean: results of snapshot comparisons (S2.1-4601)

14:45 **Tsuneo Ono, Akihiro Shiomoto and Toshiro Saino**
Recent decrease of summer time nutrients in the mixed layer of the North Pacific HNLC region (S2.1-4643)

15:00 **Kazuaki Tadokoro, Tsuneo Ono, Ichiro Yasuda, Satoshi Osafune, Yuji Okazaki, Akihiro Shiomoto and Hiroya Sugisaki**
Possible mechanism of decadal-scale variation in PO_4 concentration in the western north Pacific, and the influence on ocean productivity (S2.1-4820)

15:15 **Masahiko Fujii, Fei Chai, Lei Shi, Hisayuki Y. Inoue and Masao Ishii**
Seasonal and interannual variation of ocean carbon cycling in the western and eastern tropical-subtropical Pacific: a physical-biogeochemical modelling study (S2.1-4711)

15:30 **Julia Wohlers, Anja Engel, Eckart Zöllner, Ulrich Sommer and Ulf Riebesell**
The impact of rising sea surface temperature on the cycling of organic matter: an indoor mesocosm study (S2.1-4777)

15:45 **Richard B. Rivkin and Louis Legendre**
Microbial dynamics and response to a changing polar ocean climate (S2.1-4965)

16:00 **Martin A. Montes-Hugo, Oscar Schofield, Hugh W. Ducklow, Douglas G. Martinson and Ray Smith**
Climate mediated changes in phytoplankton productivity and air-sea CO_2 exchange on the western shelf of the Antarctic Peninsula over the last 30 years (S2.1-4938)

16:15 **Marie-Fanny Racault, Corinne Le Quéré, Erik T. Buitenhuis and Trevor Platt**
Characterisation of phytoplankton blooms and their contribution to export production (S2.1-4816)

16:30 **Maya Robert and Uta Passow**
Formation of POC through interactions between TEP and mineral ballast (S2.1-4686)

16:45 **Ian J. Totterdell**
Comparing the carbon cycle response of two ocean ecosystem models to climate change (S2.1-4909)

S2.1 Posters

S2.1-4531 **Naveen Gandhi and R. Ramesh**
Input of 'new' nitrogen by *Trichodesmium* in the Arabian Sea

S2.1-4568 **Valeriy N. Khokhlov, Alexander V. Glushkov, Nataliya S. Loboda and Tatiana V. Solonko**
Phytoplankton influence on atmospheric carbon dioxide under global climate change

S2.1-4639 **Nayrah A. Shaltout, Thanaa H. Mahmoud and Mamdouh S. Masoud**
The distribution of CO_2 surface partial pressure and air-sea CO_2 flux in El Mex Bay Alexandria, Egypt

S2.1-4648 **Marta Álvarez, Claire Lo Monaco, Toste Tanhua, Andrew Yool, Andreas Oschlies, John L. Bullister, Catherine Goyet, Frank Touratier, Rik Wanninkhof, Dave Wisegarver, Elaine McDonagh and Harry L. Bryden**
A higher storage of anthropogenic carbon in the Indian Ocean?

S2.1-4660 **Ricardo González Gil, Juan Höfer, Fernando González and Ricardo Anadón**
Trichodesmium sp. population structure along the North Atlantic subtropical gyre

S2.1-4673 **Paola Rivaro, Serena Massolo, Roberta Messa, Pasquale Castagno, Giorgio Budillon and Andrea Bergamasco**
Dissolved oxygen and nutrient export by new Antarctic Bottom Water in the Ross Sea

S2.1-4688 **Nicholas Stephens and Olivier Aumont**
Marine system sensitivity to iron speciation and organic complexation

S2.1-4690 **Nicholas Stephens, Corinne Le Quéré and Erik T. Buitenhuis**
Nitrogen fixation and nitrogen cycles in a Plankton Functional Type model

S2.1-4693 **Róisín Moriarty, Erik T. Buitenhuis and Corinne Le Quéré**
Macrozooplankton in the global ocean biogeochemical model PlankTOM10

S2.1-4700 **Mohammad Badran**
Importance of organic matter in nutrient cycles and carbon dioxide sequestration in the oligotrophic waters of the Gulf of Aqaba: open water versus fish farms

S2.1-4722 **Juan Höfer and Florentina Alvarez-Marques**
Mesozooplankton respiration in the North Atlantic subtropical gyre and its implications for the carbon cycle

S2.1-4724 **Stefano Ciavatta, Giorgio Ferrari and Roberto Pastres**
Estimation of the seasonal pattern of carbon dioxide in a coastal lagoon

S2.1-4736 **F. Xavier Niell, María Carrasco and Jesús M. Mercado**
Evaluation of carbon anhydrase importance in carbon concentration in marine autotrophic organisms

S2.1-4738 **Joannie Ferland, Michel Gosselin, Michel Starr and François Saucier**
Spatial distribution of phytoplankton production and biomass in the Hudson Bay Complex during summers 2004 to 2006

S2.1-4744 **Kazuhiro Misumi, Daisuke Tsumune, Takeshi Yoshimura, Jun Nishioka, Frank O. Bryan, Keith Lindsay, J. Keith Moore and Scott C. Doney**
Effects of two different iron sources on the iron cycle in the subarctic North Pacific

S2.1-4749 **Saber Al-Rousan, Jürgen Pätzold, Salim Al-Moghrabi and Gerold Wefer**
Invasion of anthropogenic CO_2 recorded in stable isotopes of planktonic foraminifera from the northern Gulf of Aqaba, Red Sea

S2.1-4764 **Ana Paula Oliveira, Graça Cabeçadas and Marta Nogueira**
Mechanisms underlying coastal waters CO_2 emissions

S2.1-4781 **Thomas W. Trull, A.R. Bowie, A. Davidson, F.B. Griffiths, P. Thomson, S.R. Rintoul, B. Tilbrook, S. Wright and the SAZ-SENSE team**
The Australian SAZ-SENSE study of the sensitivity of the Sub-Antarctic Zone to climate change: an introduction

S2.1-4787 **Mario Lebrato, Darryl Green, Nadia Suárez-Bosche and M. Débora Iglesias-Rodríguez**
Uncertainties in the global carbon budget: the contribution of echinoderms to the shelf/neritic export at present

S2.1-4811 **Jock C. Currie, Mike I. Lucas, Larry Hutchings and Howard N. Waldron**
Long-term nutrient changes in the southern Benguela: intensified upwelling due to global climate change?

S2.1-4844 **María Aranguren-Gassis and the CARPOS team**
Net metabolic balance in the eastern and central North Atlantic subtropical gyre in October-November 2006

S2.1-4847 **Meike Vogt, Sergio Vallina, Laurent Bopp, Erik T. Buitenhuis and Corinne Le Quéré**
The dynamics of dimethylsulphide and dimethylsulphoniopropionate in a global prognostic model

S2.1-4872 **Cosimo Solidoro, Gianpiero Cossarini, Simone Libralato, Stefano Salon and Filippo Giorgi**
Testing potential impacts of changes in precipitation temporal patterns on biogeochemical properties of a coastal marine ecosystem

S2.1-4875 **Akio Ishida, Maki N. Aita and Yasuhiro Yamanaka**
Interannual to decadal variability of the carbon cycle in the Pacific simulated in a 3-dimensional model

S2.1-4880 **Toru Miyama and Michio Kawamiya**
Estimation of ocean carbon uptake with an Earth system model under CO_2 stabilisation scenario projection

S2.1-4893 **Ferial Louanchi, M. Boudjakdji, M. Belounis, A. Taalba and L. Nacef**
A coupled approach data/model to infer the decadal changes of the surface carbon dioxide and related parameters in the Mediterranean Sea

S2.1-4939 **Sergio Vallina, Meike Vogt, Erik T. Buitenhuis and Corinne Le Quéré**
Evaluation of DMS concentrations under global warming conditions by means of a mechanistic global ocean biogeochemistry model (PlankTOM5)

S2.2 Ocean acidification and coral reef bleaching

Convenors: *Ove Hoegh-Guldberg (University of Queensland, Australia)*
Richard A. Feely Pacific Marine Environmental Laboratory, NOAA, USA)

Invited speakers: *James C. Orr (Marine Environment Laboratories, Monaco, France)*
Hans-Otto Pörtner (Alfred-Wegener Institute for Polar and Marine Research, Germany)

The global oceans are the largest natural long-term reservoir for this excess heat and CO_2, absorbing approximately 85% of the heat and 26% of the combined carbon sources from deforestation and fossil fuel burning. Recent studies have demonstrated that both the temperature increases and the increased concentrations of CO_2 in the oceans are causing significant changes in marine ecosystems. Many marine organisms are already affected by these anthropogenic stresses, including impacts due to coral bleaching and ocean acidification. The goal of this session is to review recent data on the physical, chemical, biological and geological impacts on marine ecosystems due to effects of ocean warming and acidification. Conceptual, experimental and modelling contributions at a variety of spatial and temporal scales are welcome.

Wednesday 21 May 2008 08:30 - 13:55

08:30 **Ove Hoegh-Guldberg**
Coral reef ecosystems as casualties of rapid climate change (S2.2-4953 Plenary)

10:00 ***Tea/coffee break***

10:05 Introduction by Convenors

10:35 **Hans O. Pörtner**
Ecosystem effects of ocean acidification in times of ocean warming: a physiologist's view (S2.2-4800 Invited)

11:00 **James C. Orr, Sara Jutterström, Laurent Bopp, Leif G. Anderson, Victoria J. Fabry, Thomas Frölicher, Peter Jones, Fortunat Joos, Ernst Maier-Reimer, Joachim Segschneider, Marco Steinacher and Didier Swingedouw**
Acidification of the Arctic Ocean (S2.2-4860 Invited)

11:25 **Chris Langdon, Sarah Cullison, Michael DeGrandpre, Wade McGillis, David Kadko and Jorge E. Corredor**
Detecting climate change impacts in coral reef calcification (S2.2-4786)

11:40 **John Guinotte, J.C. Orr, S. Cairns, A. Freiwald, L. Morgan and R. George**
Potential effects of ocean acidification on deep-sea coral ecosystems (S2.2-4961)

11:55 **Simone Russo, Paolo Montagna, Malcolm McCulloch, Sergio Silenzi, Claudio Mazzoli, Stefano Schiaparelli and Rossella Baldacconi**
More effective time grid reconstruction in the calibration of geochemical proxies from coral skeletons (S2.2-4834)

12:10 **Jon Havenhand, Fenina Buttler, Michael C. Thorndyke and Jane E. Williamson**
Near-future levels of ocean acidification impair fertilisation and development in a sea urchin (S2.2-4794)

12:25 **Richard A. Feely, Christopher L. Sabine and Dana Greeley**
Decadal changes in the carbonate system of the North Pacific Ocean (S2.2-4570)

12:40 **M. Debora Iglesias-Rodriguez, Paul Halloran, Ros Rickaby, John Gittins and Toby Tyrrell**
Marine calcification in a high CO_2 world: changes in coccolithophore calcification since pre-industrial times (S2.2-4671)

12:55 **Jörg Dutz**
Effects of CO_2 induced acidification on diatom food quality and copepod reproduction (S2.2-4718)

13:10 **Takeshi Yoshimura, Jun Nishioka, Koji Suzuki, Hiroshi Hattori, Hiroshi Kiyosawa, Daisuke Tsumune, Kazuhiro Misumi and Takeshi Nakatsuka**
Responses of phytoplankton assemblages and organic carbon dynamics to CO_2 increase (S2.2-4779)

13:25 **Laura M. Parker, Pauline M. Ross and Wayne A. O'Connor**
The effect of ocean acidification and temperature on the fertilisation and development of the Sydney rock oyster, *Saccostrea glomerata* (Gould, 1850) (S2.2-4547)

13:40 **Knut Yngve Børsheim**
Increased CO_2 levels in the ecosphere may modify the structure of marine plankton (S2.2-4698)

S2.2 Posters

S2.2-4541 **Kim S. Bernard and P. William Froneman**
Implications of the potential removal of a keystone sub-Antarctic species due to ocean acidification

S2.2-4593 **Evan Weller, Manuel Nunez and Gary Meyers**
Ocean-atmosphere heat flux estimates over the Great Barrier Reef and Coral Sea: implications for recent mass coral bleaching events

S2.2-4615 **Sam Dupont, Jon Havenhand and Michael C. Thorndyke**
CO_2-driven acidification radically affects larval survival and development in marine organisms

S2.2-4629 **Suchana A. Chavanich, Voranop Viyakarn and Thepsuda Loyjiw**
Mass bleaching of a soft coral, *Sarcophyton* sp., in Thailand: is this related to climate change?

S2.2-4669 **Nadia Suárez-Bosche, Mario Lebrato and M. Débora Iglesias-Rodríguez**
Effect of changes in carbonate chemistry on larval development of echinoderms

S2.2-4675 **Carles Pelejero and Eva Calvo**
Reconstructing past seawater pH from boron isotopes in carbonates

S2.2-4810 **Juancho Movilla, Eva Calvo, Carles Pelejero, Marta Ribes and Rafel Coma**
A multi-temporal approach to tackle the ocean acidification problem: insights from coral cultures and instrumental time series of pH

S2.2-4972 **Sue-Ann Watson, Paul A. Tyler and Lloyd S. Peck**
Calcified marine invertebrates: Latitudinal variation and ocean acidification

Theme 3. Impacts of climate variability and change on the coastal environment

Climate change will profoundly shape the global coast. Changes in weather patterns (temperature, rainfall and coastal winds) and extreme events could impact coastal ecosystems as well as societal use of coastal regions. A key factor is likely to be change in availability of fresh water during both flooding and drought periods. Long-term impacts such as sea-level rise and changes in the intensity and frequency of hurricanes and storms could lead to changes in shoreline migration and extent of coastal flooding, salinisation of aquifers, and changes in sediment and nutrient transport. Changes in the production and integrity of coastal ecosystems in response to altered climate and physical regimes could decrease the ecosystem goods and services they provide. Because human populations are increasing most rapidly in coastal areas, mitigating the impacts of anticipated climate change is a key determinant in reducing the vulnerability of coastal populations and ecosystems to change and increasing resilience in both urban and rural coastal regions.

S3.1 Natural hazards, sea level rise and coastal erosion

Convenors: *Kevin Horsburgh (Proudman Oceanographic Laboratory, UK)*
Iñigo J. Losada (Instituto de Hidráulica Ambiental, Universidad de Cantabria, Spain)

Invited speakers: *John Rees (British Geological Survey, UK)*
Katja Woth (Institute for Coastal Research, GKSS Research Center, Germany)

Many coastal areas around the world are experiencing an increased impact of natural hazards. The impact of climate change to the coastal systems, resulting from increasing sea level rise, storms surges and wave heights can cause severe coastal erosion and flooding with further consequences on infrastructure and human life, especially in underdeveloped countries. A precise knowledge on the magnitude of these impacts and the factors controlling them is a prerequisite to perform any decision making process related to mitigation and adaptation policies. Papers are invited exploring linkages between climate change and coastal natural hazards. Studies may also address climate change impacts on the coast including altered hydrology and sea-level rise, changes in surface waves, storm surges, altered ocean-meteorological weather patterns and frequency of extreme events. In particular, research that improves our understanding of sea-level rise and variability, including the different factors influencing the observed sea level, observational systems and requirements needed to refine this, and future projections and uncertainties, were especially welcomed.

Thursday 22 May 2008 08:30 - 17:00

08:30 **Jason A. Lowe, T. Howard, A. Pardaens and K. Horsburgh**
Can we quantify the risk of large increases in sea level extremes? (S3.1-4962 Plenary)

10:00 ***Tea/coffee break***

10:30 Introduction by Convenors

10:35 **John G. Rees**
Coastal erosion under changing climates (S3.1-4964 Invited)

11:00 **Katja Woth and Hans von Storch**
Storm surges, perspectives and options (S3.1-4799 Invited)

11:25 **John A. Church, C.M. Domingues, N.J. White, P.J. Gleckler, S.E. Wijffels, P.M. Barker and J.R. Dunn**
Improved ocean-warming estimates: implications for climate models and sea-level rise (S3.1-4592)

11:40 **Alejandro Cearreta, Eduardo Leorri, Roland Gehrels and Benjamin Horton**
Two hundred years of sea-level rise reconstruction by combining instrumental and geological data from the southern Bay of Biscay (S3.1-4553)

11:55 **Damià Gomis, Enrique Álvarez-Fanjul, Michael N. Tsimplis, Marta Marcos, Ananda Pascual, Simón Ruiz, Sesbastià Monserrat, Francisco Mir, Gabriel Jordà, Marcos G. Sotillo, Begoña Pérez, Immaculada Ferrer, Roland Aznar, Simon A. Josey, Gilles Larnicol and Samuel Somot**
The VANIMEDAT project: decadal and interdecadal sea-level variability in the Mediterranean Sea and the northeastern sector of the Atlantic Ocean (S3.1-4546)

12:10 **Francisco M. Calafat, Damià Gomis, A. Pascual, Marta Marcos and Simón Ruiz**
Recovery of sea level fields of the last decades from altimetry and tide gauge data (S3.1-4662)

12:25 **Marta Marcos and Michael N. Tsimplis**
Sea level change and extreme events in the Mediterranean Sea (S3.1-4559)

12:40 **Sommart Niemnil, Marc Naeiji and Itthi Trisirisatayawong**
Sea level trend in Gulf of Thailand using satellite altimetry data (S3.1-4573)

12:55 **Ademilson Zamboni and João Luiz Nicolodi**
An analysis of Brazilian coastal erosion (S3.1-4758)

14:30 **Melisa Menéndez, Fernando J. Méndez and Inigo J. Losada**
Forecasting the seasonal to interannual variability of extreme sea levels (S3.1-4588)

14:45 **Wataru Sasaki and Toshiyuki Hibiya**
Interannual variability and recent increase in the summertime significant wave heights in the western North Pacific (S3.1-4895)

15:00 **Jennifer L. Irish, Mir Emad Mousavi, Billy L. Edge, Francisco Olivera and Ashley E. Frey**
Quantification of climate change impacts on hurricane flooding (S3.1-4557)

15:15 **Il-Ju Moon, Seok Jae Kwon and S.K. Kang**
Growing intensification of landfalling typhoon at higher latitude (S3.1-4825)

15:30 **Tetyana L. Kuchma**
Contribution of remote sensing data to ocean hazards monitoring and emergency system development (S3.1-4829)

15:45 **José A. Jiménez, Vicenç Gracia and Herminia I. Valdemoro**
The Ebro delta coastal response during 2001-2004: a proxy of the potential effects of an increase in storminess (S3.1-4554)

16:00 **Fernando J. Méndez, Inigo J. Losada, Raul Medina, Maitane Olabarrieta, Melisa Menéndez and Paula Camus**
A methodology to evaluate the impacts of climate change in a coastal system (S3.1-4587)

16:15 **Carlos Coelho, Raquel Silva, F. Veloso-Gomes and F. Taveira-Pinto**
Potential impacts of climate change on NW Portuguese coastal zones (S3.1-4798)

16:30 **António Jorge da Silva, Inês Martins, Ana Santos and Luísa Bastos**
NW Iberian coastal current: a feature of extreme freshwater and wind conditions (S3.1-4902)

S3.1 Posters

S3.1-4550 **Pessiezoum D. Adjoussi and Adoté Blivi**
Moving of the Togo shoreline detected by remote sensing. An example of coastal vulnerability to sea level rise

S3.1-4578 **Mohamed Ahmed Sidi Cheikh and Yelli Diawara**
Using GIS for vulnerability assessment to climate change: a case study National Park of Banc d'Arguin (Mauritania)

S3.1-4614 **Francisco Pastor, María J. Estrela, Javier Miró, Igor Gómez, Jose A. Valiente and Raquel Niclòs**
Torrential rains: using satellite-retrieved sea surface temperature as a forecast input data

S3.1-4713 **Wataru Sasaki, Koji Dairaku and Satoshi Iizuka**
Toward future projections of wind and wave climate in the northwestern Pacific Ocean using three different regional climate models

S3.1-4789 **Saverio Devoti, Luca Parlagreco, Pasquale Di Pace and Sergio Silenzi**
Predicting of coastal flooding in Latium coast (central Italy)

S3.1-4828 **Seok Jae Kwon, Eunil Lee and Il-Ju Moon**
Long-term variations of storm surge intensity along the Korean Coast and their connection with climate change

S3.2 Estuarine and wetland ecosystem functioning

Convenors: *Robert R. Christian (East Carolina University, USA)*
Nancy Rabalais (Defelice Center, Louisiana Universities Marine Consortium, USA)

Invited Speakers: *Robert Diaz (Virginia Institute of Marine Science, USA)*
Pierluigi Viaroli (Parma University, Italy)

Climate change will potentially result in dramatic alterations for coastal ecosystems - affecting fluxes of water, sediments and nutrients; geomorphology; and societal use and management of coastal regions. Particularly sensitive are sea-level controlled wetlands and enclosed water bodies, such as estuaries and coastal lagoons. Manifestations of climate change include altered hydrology and sea-level rise, altered weather patterns and frequency of extreme events. The ability of coastal ecosystems to remain productive and functional within the complex interactions of landscape and human dependence relies on continued ecosystem processing of materials and energy. Human activities influence these functions and will modify the coastal ecosystem's ability to respond to (or even survive) climate change. Human impacts on ecosystem function are being addressed widely for natural resource management, and the effects of climate change on ecosystem functioning are receiving more attention. The challenge is to understand how the two interplay in management and sustainability of ecosystems that support the viable integration of humans and future coastal landscapes. This session invited papers that explore how the consequences of climate change may result in altered material fluxes, geomorphology, hydrology, habitats, ecosystem functioning, and societal functioning within coastal ecosystems.

Friday 23 May 2008 08:30 - 15:45

08:30 **Dan Baird**
An assessment of the functional variability of coastal ecosystems in the context of environmental changes (S3.2-4742 Plenary)

10:00 ***Tea/coffee break***

10:30 Introduction by Convenors

10:35 **Pierluigi Viaroli**
Assessing ecosystem properties and predicting responses of coastal lagoons to altered hydrology, nutrient cycling and direct anthropogenic pressures (S3.2-4756 Invited)

11:00 **Robert J. Diaz**
Future climate and oxygen depletion in coastal oceans (S3.2-4585 Invited)

11:25 **Jonne Kotta, Ilmar Kotta and Helen Orav-Kotta**
Identification of important spatial and temporal scales of ecological variables: the relative contribution of climate variables on a soft bottom invertebrate assemblage (S3.2-4877)

11:40 **José M. Gorostiaga, Nahiara Muguerza, Stéfani Novoa, Alberto Santolaria, Antonio Secilla and Isabel Díez**
Changes in the benthic subtidal vegetation along the Basque coast (north Spain) and the probable relationship with climate change (S3.2-4852)

11:55 **Simone Libralato and Cosimo Solidoro**
Effects of climate-driven changes on coastal food webs: the role of precipitation patterns (S3.2-4871)

12:10 **Tamara Cibic, Oriana Blasutto, Nicoletta Burba, Andrea Bussani, Cinzia Comici, Claus Falconi and Serena Fonda Umani**
Benthic diatom response to changing environmental conditions (S3.2-4751)

12:25 **Lambini Sakab Kombat**
Conservation of the Goaso watersheds in Ghana, a participatory approach to sustainability (S3.2-4732)

12:40 **Monika Kędra, Maria Włodarska-Kowalczuk and Jan Marcin Węsławski**
Decadal change in soft-bottom community structure in high arctic fjord (Kongsfjorden, Svalbard) (S3.2-4604)

12:55 **Sonia Moreno and F. Xavier Niell**
Temperature methanogenesis regulation in shallow temperate estuaries (S3.2-4734)

14:30 **Inés Álvarez, Moncho Gómez-Gesteira, Maite de Castro and João Miguel Dias**
Changes in coastal upwelling conditions along the western coast of the Iberian Peninsula for the last 40 years (S3.2-4683)

14:45 **Georg Martin**
Response of structure and distribution pattern of benthic littoral communities to climatic variation and eutrophication (S3.2-4892)

15:00 **Melanie J. Bishop and Brendan P. Kelaher**
Compositional changes in aquatic macrophytes propagate through detrital food webs (S3.2-4555)

15:15 **Candida Savage, Peter R. Leavitt and Ragnar Elmgren**
Effects of land use, urbanisation, and climate change on coastal eutrophication in the Baltic Sea (S3.2-4707)

15:30 **Prabhath Patabendi**
Challenges and issues in managing marine ecosystems in Sri Lanka (S3.2-4523)

S3.2 Posters

S3.2-4577 **Arturo Sousa, Pablo García-Murillo, Julia Morales and Leoncio García-Barrón**
Anthropic and natural impacts upon the coastal lagoons in the SW of Spain (Doñana National Park)

S3.2-4584 **Nancy N. Rabalais**
Coastal hypoxia will be aggravated by climate change

S3.2-4617 **Robert R. Christian, Mark M. Brinson, David M. Kunz, Enrique Reyes and Christine M. Voss**
Changes in coastal wetland function with sea-level rise

S3.2-4735 **Miriam Ruiz Nieto, Antonio Avilés and F. Xavier Niell**
A series of data in water and sediment conditions (from 1980s to present) in a shallow temperate estuary (Palmones, Spain)

S3.2-4775 **Guillermo Aravena, Fernando Villate, Arantza Iriarte, Ibon Uriarte and Berta Ibañez**
Influence of different North Atlantic Oscillation indices on climatic factors and water temperature in Basque estuaries (Gulf of Biscay)

S3.2-4896 **Liis Rostin and G. Martin**
Prediction of variation in structure of benthic littoral community of offshore hardbottom banks in NE Baltic Sea related to changes in climatic conditions

S3.2-4943 **Melissa K. Langridge, Craig E. Franklin and Greg A. Skilleter**
Responses to thermal stress in the intertidal: Utilisation of refuge by a predatory whelk

S3.2-4950 **Taehee Na, Tongsup Lee, Jung Hyun Oak, Jaeyoung Lee and Ik Kyo Chung**
Estimation of seaweed carbon uptake as a CO_2 removal mechanism

Theme 4. Impacts of climate change on marine ecosystems: Present status of our understanding

Recent studies have documented the impacts of climate variability and change, on a range of ecosystems, over a range of time scales. While we can now begin to identify and monitor some of these impacts, many questions remain. These include how ocean processes will change in the future, the mechanisms involved, what effects such changes may have on ecosystems, and whether we can develop indicators for early detection of changes. This theme particularly encouraged comparative studies of relations between climate variability, climate change and marine ecosystems, as well as presentations which consider mechanisms that link physical forcing with ecosystem change. Central themes are: What are the key processes of ecosystem change and how might they be monitored? Can we predict shifts in species distributions and changes in productivity? Are there other limits that will constrain such global movements? What is the status of our knowledge of the ability of organisms to adapt to climate change? What are the options for managing marine ecosystems to sustain goods essential to societies? Such understanding is essential if we are to effectively manage global marine living resources such as fisheries and marine protected areas during this period of increased human impact. Studies from both shelf and open ocean areas were encouraged.

S4.1 Impacts on lower trophic levels

Convenors: *Delphine Bonnet (University of Montpellier, France)*
Roger Harris (Plymouth Marine Laboratory, UK)

Invited speakers: *Sanae Chiba (Frontier Research Center for Global Change, Japan)*
Angel Lopez-Urrutia (Centro Oceanográfico de Gijón, Instituto Español de Oceanografia, Spain)

Physiological processes of planktonic organisms, such as nutrient uptake, photosynthesis, respiration, and reproductive development are highly sensitive to temperature as well as other environmental factors such as UV and CO_2. Most plankton species are short lived, resulting in tight coupling between environmental effects and plankton dynamics. In contrast to higher trophic levels such as fish, few plankton species are commercially exploited so changes at lower trophic levels may be more easily be attributed to climate variability and change. These characteristics make lower trophic levels good potential indicators of the global impacts of climate change. Impacts may include changes in distribution of individual species and communities, in the timing of important lifecycle events or phenology, in abundance and community structure, and through feed-backs to the climate system. In turn these climate impacts on plankton may have consequences for higher trophic levels and ecosystem structure and dynamics. In this session contributions on the impacts of climate change on all lower food web components of the plankton, from bacteria to mesozooplankton, were particularly encouraged.

Thursday 22 May 2008 09:15 - 17:00

09:15 **Joaquim I. Goes, Helga R. Gomes, Prasad G. Thoppil, Prabhu Matondkar, Adnan Al-Azri and John T. Fasullo**
Shrinking snowcaps and rising productivity: response of the Arabian Sea ecosystem to recent climate change (S4.1-4619 Plenary)

10:00 ***Tea/coffee break***

10:30 Introduction by Convenors

10:35 **Ángel López-Urrutia**
Temperature rules the oceans biota (S4.1-4576 Invited)

11:00 **Sanae Chiba**
Anyway the wind blows… Scenario from climate to the lower trophic levels in the western North Pacific (S4.1-4624 Invited)

11:25 **Clara Ruiz-González, M. Galí, J.M. Gasol and R. Simó**
Effects of increasing UV radiation on arctic bacterioplankton community structure and activity (S4.1-4843)

11:40 **Jeffrey J. Polovina, Evan A. Howell and Melanie Abecassis**
Ocean's least productive waters are expanding (S4.1-4524)

11:55 **Violeta Saló, Rafel Simó and Albert Calbet**
Role of microzooplankton grazing in the DMS cycle: laboratory and field studies (S4.1-4836)

12:10 **Severine Alvain, C. Le Quéré, L. Bopp, M.-F. Racault, Y. Dandonneau and C. Moulin**
Shifts in phytoplankton ecosystem composition and large scale indices of climate variability (S4.1-4654)

12:25 **William K.W. Li**
Propagation of an atmospheric climate signal to local phytoplankton in a small marine basin (S4.1-4590)

12:40 **Xosé Anxelu G. Morán, Ángel López-Urrutia, Alejandra Calvo-Díaz and William K.W. Li**
Ocean warming and phytoplankton size (S4.1-4682)

12:55 **Stephanie Henson, J.P. Dunne and J.L. Sarmiento**
Decadal changes in North Atlantic phytoplankton blooms (S4.1-4856)

13:10 ***Lunch***

14:30 **Stephen Dye, Sonja Van Leeuwen, Naomi Greenwood and Liam Fernand**
The future of shelf seas: Projections and observations of changes in the thermal structure and consequences for primary production and water quality (S4.1-4685)

14:45 **Mark D. Ohman, Michael R. Landry, Ralf Goericke, Peter J.S. Franks, Karen S. Baker, and the CCE LTER participants**
A mechanistic perspective on ecosystem response to climate variability: the California Current Ecosystem LTER site (S4.1-4857)

15:00 **Andrew D. Barton, M. Follows and S. Dutkiewicz**
How does climate change impact the biodiversity of marine phytoplankton communities in the North Atlantic Ocean? (S4.1-4903)

15:15 **Christian Möllmann, Janna Peters, Rabea Diekmann and Georgs Kornilovs**
Ecosystem consequences of decadal changes in energy and carbon flows due to climate-induced changes in Baltic zooplankton (S4.1-4649)

15:30 **Fernando Gómez, Sami Soussi, Hervé Claustre and Bernard Queguiner**
Microplankton response to climatic variability in the English Channel and western Mediterranean Sea (S4.1-4533)

15:45 **Antonio Bode, Maria Teresa Alvarez-Ossorio, Jose Manuel Cabanas, Ana Miranda and Manuel Varela**
Surface warming, decreasing upwelling intensity and plankton off Galicia (NW Spain) (S4.1-4664)

16:00 **Anthony J. Richardson, Andrew Bakun and Mark J. Gibbons**
The jellyfish joyride: can we stop oceans sliding down the slippery slope to slimy stingers? (S4.1-4881)

16:15 **Ilaria Nardello, Russell W. Poole, Heather Cannaby, Caroline Cusack, Ciar O'Toole, Chris Lynam, Sinan Y. Husrevoglu, Joe Silke, Guy Westbrook, Leonie Dransfeld, Ken Whelan and G. Nolan**
Effects of North Atlantic climate variations on the Irish marine ecosystem (S4.1-4653)

16:30 **Taketo Hashioka, Takashi T. Sakamoto and Yasuhiro Yamanaka**
Impacts of global warming on lower-trophic level ecosystem projected by a 3-D high-resolution ecosystem model (S4.1-4848)

16:45 **SCOR WG Members, Associate Members, Data Collaborators and David Mackas**
SCOR WG125 "Global comparison of zooplankton time series": A summary of results (S4.1-4760)

S4.1 Posters

S4.1-4059 **Yuriy N. Tokarev, Viktor V. Melnikov and Alexandra V. Temnykh**
Effect of climate changes on the aquatic ecosystem of the Black Sea: from planktonic communities to fish recruitment

S4.1-4534 **Fernando Gómez**
Phytoplankton invasive species: comments on the validity of the non-indigenous dinoflagellates and diatoms in the European Seas

S4.1-4565 **Alexander Mikaelyan, Larisa Pautova and Vladimir Silkin**
The long-term dynamics of coccolithophorids in the Black Sea with respect to environmental trends

S4.1-4575 **Damien Cazamea-Catalan, Delphine Bonnet, Guy Charmantier and Mireille Charmantier-Daures**
Biological cycle of *Sphaeroma serratum* (Isopoda) in the Thau lagoon: Impact of global change from 1972 to 2006

S4.1-4608 **Karina Stockmann, Ulrich Callies and Karen H. Wiltshire**
Hydrographic changes and their connection to the phytoplankton spring bloom in the German Bight

S4.1-4634 **Maria Grazia Mazzocchi**
To what extent do coastal zooplankton reflect Mediterranean climate variability?

S4.1-4650 **José-Abel Flores, Francisco J. Sierro, Elena Colmenero-Hidalgo, José M. Gravalosa, Miquel Canals, Jaime Frigola, Joan Grimalt, Serge Berne and Bernard Dennielou**
Coccolithophore response to abrupt and short-term climate changes in the Gulf of Lions (western Mediterranean) for the last 25,000 years

S4.1-4651 **Jordi Solé, Simón Ruiz, Ananda Pascual, Bruno Buongiorno Nardelli, Gianluca Volpe, Rosalia Santoleri, Alberto Alvarez, Guillermo Vizoso and Joaquín Tintoré**
Study of potential effects of climatic forcing on the ecosystems of the western Mediterranean Sea

S4.1-4656 **Luis Valdés, Gonzalo González-Nuevo, Jesús Cabal and Enrique Nogueira**
How will the ocean warming affect the planktonic diversity?

S4.1-4672 **M. Varela and CLIGAL-Pelagic Working Group**
Impact of climate change on the marine pelagic ecosystems off Galicia (NW Spain). I: Water characteristics and plankton

S4.1-4677 **Marcos Llope and Priscilla Licandro**
The effect of the North Sea regime shift on the distribution of plankton functional groups and biomass

S4.1-4679 **Nunzio Penna, Fabio Ricci and Samuela Capellacci**
Unusual mucilage event along Italian coasts in the northern Adriatic Sea

S4.1-4689 **María Huete-Ortega, Manuel Varela, Antonio Bode and Emilio Marañón**
Interannual variability in the size-abundance relationship of nano- and micro-phytoplankton in a coastal marine ecosystem

S4.1-4694 **Vincent Vantrepotte and Frédéric Mélin**
Temporal variability of 10-year global SeaWiFS time series of phytoplankton chlorophyll ***a*** concentration

S4.1-4782 **Maki N. Aita, S. Lan Smith, Akio Ishida, Michio J. Kishi and Yasuhiro Yamanaka**
Effects of iron on spatial and temporal phytoplankton distribution using a global 3-D ecosystem model (NEMURO)

S4.1-4788 **Damiano Virgilio, Nicoletta Burba, Daniela Fornasaro, Benedetta Guardiani, Marina Cabrini and Serena Fonda Umani**
Phytoplankton assemblages in the Gulf of Trieste (northern Adriatic Sea): are there signals of climate change? A twenty-year case study

S4.1-4790 **Naoki Yoshie, Kosei Komatsu, Shin-ichi Ito, Tsuneo Ono, Kazuaki Tadokoro, Hiroaki Saito and Yasuhiro Yamanaka**
Seasonal and interannual variation of the marine ecosystem in the western subarctic Pacific simulated by a 3D marine ecosystem model

S4.1-4796 **Merja H. Schlueter, Agostino Merico, Karen H. Wiltshire and Wulf Greve**
A statistical analysis of climate variability and ecosystem response in the German Bight

S4.1-4835 **Grbec Branka, Mira Morović, Juan Carlos Molinero, Gordana Beg Paklar, Frano Matić, Ivona Marasović Jakov Dulčić and Sanja Matić-Skoko**
The influence of northern hemisphere climate patterns on the Adriatic Sea pelagic ecosystem

S4.1-4838 **Eva Teira, Sandra Martínez-García, Alejandra Calvo-Díaz, Xosé Anxelu G. Morán and Emilio Fernández**
Impact of inorganic and organic nutrient inputs on bacterioplankton community composition along a latitudinal transect in the Atlantic Ocean

S4.1-4842 **Sandra Martínez-García, Eva Teira, Emilio Fernández and Alejandra Calvo-Díaz**
Response of open ocean microbial communities to inorganic and organic inputs: a microcosm approach along a latitudinal transect in the Atlantic Ocean

S4.1-4865 **Kosei Sasaoka, Sanae Chiba and Toshiro Saino**
Recent trends in the North Pacific chlorophyll and their controlling factor in relation to climatic forcing using satellite remote sensing

S4.1-4868 **Roger Harris and WGZE**
ICES Working Group on Zooplankton Ecology

S4.1-4869 **Roger Harris (on behalf of the BASIN Steering Group: Peter Wiebe, Cisco Werner, Brad DeYoung, Pierre Pepin and Mike St. John).**
BASIN: Basin-scale Analysis, Synthesis, and Integration: resolving the impact of climatic processes on ecosystems of the North Atlantic basin and shelf seas

S4.1-4870 **Roger Harris and METAOCEANS students**
METAOCEANS: training in advanced meta-analysis and comparative analysis techniques applied to marine ecosystems

S4.1-4873 **Adnan Al-Azri, Joaquim I. Goes, Helga R. Gomes and Khalid. Al-Hashmi**
The occurrence of potentially harmful algal blooms (HAB's) in the Gulf of Oman in relation to environmental changes

S4.1-4874 **Maria M. Sala, Jesús M. Arrieta, Dolors Vaqué, Julia Boras and Carlos M. Duarte**
Effects of ice meltwater on Arctic bacterioplankton

S4.1-4876 **Elena Arashkevich, Alexander Timonin, Alexander Kazmin and Andrei Zatsepin**
Interactions among climate, circulation, and plankton distribution in the Black Sea

S4.1-4914 **Renate Scharek, Mikel Latasa, Ramon Massana and Vanessa Balagué**
Comparing microphytoplankton seasonality after 50 years at a coastal site in the northwest Mediterranean

S4.1-4926 **Sei-Ichi Saitoh, Takahiro Iida, Kohei Mizobata and Mitsuhiro Toratani**
Recent variability of coccolithophore blooms in the eastern Bering Sea shelf

S4.1-4927 **Todd D. O'Brien**
COPEPOD: a climate studies resource for historical plankton data

S4.1-4931 **Muzzneena Ahmad Mustapha and Sei-Ichi Saitoh**
Seasonal and interannual variability of primary production of scallop forming area in the Okhotsk Sea in relation to climate changes

S4.1-4940 **Snejana P. Moncheva, Valentina G. Doncheva, Kremena B. Stefanova and Lyudmila T. Kamburska**
Shifts in the Black Sea plankton communities: phenological response to climate forcing or nutrient alterations

S4.1-4945 **E. Orlova, V. Guzenko, P. Dalpadado, T. Knutsen, V. Nesterova and O. Yurko**
Reaction of dominant copepods to climatic changes in the Barents Sea

S4.2 Impacts on higher trophic levels

Convenors: *Jürgen Alheit (Baltic Sea Research Institute, University of Rostock, Germany)*
Kenneth Drinkwater (Institute of Marine Research, Norway)
Akihiko Yatsu (Hokkaido National Fisheries Research Institute, Japan)

Invited Speakers: *Keith Brander (Technical University of Denmark, Denmark)*
Michio Kishi (Hokkaido University, Japan)

Marine species, including many commercially-exploited stocks, have evolved species-specific life histories through adaptation to complex environmental conditions. They also clearly respond to ocean variability over a wide range of spatial and temporal scales and through various pathways. These responses are both direct, through regulating metabolic factors such as swimming speeds, activity rates, feeding rates and reproduction, and indirect, primarily through effects on the food web. They can result in changes in growth, recruitment, abundance, age of maturity, distribution, etc. The effects of fishing can also make populations more vulnerable to climate change and changes in higher trophic levels, in turn, can affect ecosystems through, for example, "top-down" or "wasp-waist" controls. In this session we encourage contributions on the impacts of climate variability and change (either direct or indirect) on trophic levels above mesozooplankton; ecosystem modelling that includes higher trophic levels; mechanistic linkages between climate change and population dynamics; the interaction between climate and fishing; and indicators that are useful for earlier detection of ecosystem changes. Contributions addressing perspectives on management of ecosystems and commercially-exploited stocks in the face of future climate change were also invited.

Monday 19 May 2008 10:00 - 18:15

10:00 **Patrick Lehodey, Inna Senina, John Sibert, Laurent Bopp and Beatriz Calmettes**
Forecasts of population trends for two species of tuna under an IPCC scenario (S4.2-4564 Plenary)

10:45 ***Tea/coffee break***

11:15 Introduction by Convenors

11:20 **Keith Brander**
Predicting impacts of climate change on fisheries production (S4.2-4699 Invited)

11:45 **Michio J. Kishi, Yasunori Sakurai and Masahide Kaeriyama**
What will happen on the stock of chum salmon, walleye pollack, and common squid in the Northern Pacific? (S4.2-4596 Invited)

12:10 **Adriaan D. Rijnsdorp and Christian Möllmann**
Marine fish and fisheries in a changing climate (S4.2-4719)

12:25 **Yury I. Zuenko, Elena I. Ustinova, Alexander N. Vdovin, Vladimir A. Nuzhdin and Natalia T. Dolganova**
Impacts of climate shifts in the late 20th century on zooplankton and fishery resources in the Japan Sea (S4.2-4763)

12:40 **Jan-Olaf Meynecke**
Effect of climate change on estuarine fish production in Queensland, Australia (S4.2-4960)

12:55 **Myron A. Peck, Ute Daewel and Corinna Schrum**
Larval fish physiology and individual-based models: exploring climate impacts on early life stages of key species (S4.2-4897)

13:10 ***Lunch***

14:30 **Frode B. Vikebø, T. Kristiansen, F.E. Werner, S. Sundby, R.G. Lough and E.G. Durbin**
Temperature, light and food mediated growth for larval cod (*Gadus morhua*) at latitudinal extremes: a comparative study between the NW Atlantic and Norwegian Sea ecosystems (S4.2-4806)

14:45 **Ralf van Hal, Catherine L. Scott and Christine Röckmann**
Variability in environmental factors affecting the recruitment of fish species in the North East Atlantic (S4.2-4646)

15:00 **Jürgen Alheit**
Impact of climate variability on small pelagic fishes in the Atlantic and Pacific: a comparison (S4.2-4920)

15:15 **Akihiko Yatsu, Hiroshi Nishida, Ken Mori, Yasunori Sakurai and Sanae Chiba**
Mechanisms of population dynamics of Japanese sardine and Japanese common squid in the Kuroshio/Oyashio current system, with a speculation on their future (S4.2-4626)

15:30 **Asit Mazumder, Marc Trudel, Ed Farley, Jamal Moss, Lisa Eisner and Jim Murphy**
Shifting warm-water to cold-water conditions and food web dynamics of juvenile Pacific salmon in the eastern Bering Sea ecosystem (S4.2-4612)

15:45 **Kentaro Morita and Masa-aki Fukuwaka**
Potential effect of rising temperature on growth performance and its influence on chum salmon (S4.2-4551)

16:30 **Catarina Vinagre, Telma Ferreira, Lélia Matos, Henrique N. Cabral and Maria José Costa**
Latitudinal gradients in growth and spawning of sea bass: effect of temperature and photoperiod (S4.2-4625)

16:45 **Anne B. Hollowed, Z. Teresa A'mar, Richard Beamish, Nicholas A. Bond, James E. Overland, Michael J. Schirripa and Tom Wilderbuer**
Fish population response to future climate drivers: A next step forward (S4.2-4815)

17:00 **Unai Ganzedo, Eduardo Zorita, Aldo Pier Solari, Guillem Chust, Angelo Santana Del Pino and Juan José Castro**
What drives tuna captures between 1525 and 1756 centuries in southern Europe? (S4.2-4743)

17:15 **Earl G. Dawe, Donald G. Parsons and Eugene B. Colbourne**
Effects of ocean climate variation on production, maturation, and recruitment of snow crab (*Chionoecetes opilio*) on the Newfoundland-Labrador shelf (S4.2-4739)

17:30 **Martin O. Lindegren and Christian Möllmann**
The future of Baltic cod - modelling interactions between climate, food web dynamics and fisheries (S4.2-4605)

17:45 **Marc Trudel, David L. Mackas and Asit Mazumder**
Climate-mediated changes in prey quality affect the production of wild Pacific salmon (S4.2-4628)

18:00 **Carmela Porteiro, Jose M. Cabanas, M.B. Santos and G.J. Pierce**
The effect of environmental changes in the NE Atlantic sardine (*Sardina pilchardus*) fishery (S4.2-4728)

S4.2 Posters

S4.2-4525 **Leonid Klyashtorin and Alexey Lyubushin**
Cyclic climate changes and fish productivity in the past and at present

S4.2-4595 **Yongjun Tian, Hideo Sakaji, Shingo Ino and Masahiro Kuno**
Long-term changes in the abundance and population structure of yellowtail *Seriola quinqueradiata* in the Japanese waters and its relation to sea surface temperature over the last century

S4.2-4613 **Oleg A. Bulatov**
The influence of water temperature on abundance of walleye pollock and northeast arctic cod

S4.2-4621 **Dale Haidvogel and Elizabeth J. Turner**
Pan-regional synthesis in the US GLOBEC programme

S4.2-4655 **Jesús Cabal, Gonzalo González-Nuevo, Jerónimo de la Hoz, Enrique Nogueira and Luis Valdés**
Relationship between ocean warming and catches of Atlantic salmon (*Salmo salar*) at the southern boundary of the European geographical distribution

S4.2-4665 **A. Bode and CLIGAL-Pelagic Working Group**
Impact of climate change on the marine pelagic ecosystems off Galicia (NW Spain). II: Living resources

S4.2-4674 **Elena Eriksen, Geir Odd Johansen and Jan Erik Stiansen**
Impacts of climate variability on spatial distribution of 0-group fish in the Barents Sea

S4.2-4696 **Md. Kawser Ahmed and Shamima Sultana**
Impact of climate change and variability on coastal water and fisheries resources of Bangladesh

S4.2-4741 **Edmundo Casillas and W.T. Peterson**
Impact of climate variability on the California Current ecosystem and Pacific salmon survival: linkages, ocean condition indicators, forecasting, and management perspectives

S4.2-4748 **Michinobu Kuwae, Hidetaka Takeoka, Koji Omori, Narumi K. Tsugeki and Takashige Sugimoto**
Sedimentary fish abundance records over the last 1500 yrs from the western North Pacific: Basin-scale link of sardine and anchovy abundance

S4.2-4765 **Mark R. Payne, Emma M.C. Hatfield, Mark Dickey-Collas, Tone Falkenhaug, Alejandro Gallego, Joachim Gröger, Priscilla Licandro, Marcos Llope, Peter Munk, Christine Röckmann, Jörn O. Schmidt and Richard D.M. Nash**
Is a changing North Sea environment making sustainable exploitation of herring more difficult?

S4.2-4773 **Ángela M. Caballero-Alfonso and José J. Castro-Hernández**
Evidence of the North-east Atlantic warming and it consequences on marine fishes

S4.2-4780 **Helen Bailey, George Shillinger, Daniel Palacios, Steven J. Bograd, James Spotila, Frank Paladino, Scott Eckert, Graeme Hays and Barbara Block**
Comparing Pacific and Atlantic leatherback turtle movements and oceanography using state-space modelling

S4.2-4826 **Ulysses Madrid Montojo, Norvida Cruz Gatdula, Mirriam Formeloza Cayme and Valeriano Meneses Borja**
Associating a fish kill event with seawater temperature in the Philippines

S4.2-4830 **Victor A. Nadtochy, Yury I. Zuenko and Galina V. Moiseychenko**
Impact of climate change in the 20th century on benthos communities in Peter the Great Bay (Japan Sea)

S4.2-4833 **Didzis Ustups, Baerbel Karulis-Muller, Andrei Makarchouk and Maris Pliksh**
The effect of the environmental variability on the early life stage of flounder *Platichthys flesus* in the Baltic Sea

S4.2-4851 **Mira Morović, Branka Grbec, Juan Carlos Molinero, Gordana Beg Paklar, Jakov Dulčić, Mario Bone, Frano Matić and Živana Ninčević**
Toward a better understanding of climate forcing on decadal changes in the Adriatic Sea ecosystem

S4.2-4858 **A.V. Suntsov**
Ichthyoplankton assemblages off northern Peru: spatio-temporal dynamics and relation to *El Niño*/ Southern Oscillation

S4.2-4901 **Cesar Meiners, Lourdes Fernandez and Ana Ramos**
Distribution dynamics of three hake species along the NW African coast: is climate variability a key factor?

S4.2-4905 **Myron A. Peck, Helena Hauss and Laura Würzberg**
Biophysical modelling of climate impacts on larval fish: testing parameterisations at the individual level

S4.2-4933 **Yeonghye Kim, Sukgeun Jung, Jinkoo Kim and Young-Shil Kang**
Influence of physical and biological oceanography on population fluctuations of the yellow croaker (*Larimichthys polyactis*) in the Yellow Sea/East China Sea

S4.2-4944 **Oleg Titov, Yuri. Lepesevich, Nikolay Tarasov and Andrey Pedchenko**
Climate change and prospects of fisheries in the Barents Sea and adjacent Arctic seas

S4.2-4956 **Larissa A. Gayko**
Influence of a change in climate on the development of molluscs in marine farming (for Possyet Bay, Sea of Japan)

S4.2-4966 **Henrique N. Cabral, J.L. Costa, C. Vinagre, J. Loff, J.J. Jacinto, N. Lopes, C. Freitas and M.J. Costa**
Is there evidence of climate change impacts on Portuguese coastal fish assemblages?

S4.2-4973 **Irene Mantzouni and Brian R. MacKenzie**
Could warmer years mean good years for cod? A pan-Atlantic meta-analytic perspective

S4.2-4980 **Kristina Raab, Mark Dickey-Collas and Adriaan D. Rijnsdorp**
Anchovy as indicator of climatic regime shifts?

Theme 5. Scenarios-mitigation-reduction of impact of future climate change on the marine environment: from regional to global scale

Marine ecosystems worldwide are changing as a result of climate variability and climate change. This session will consider potential impacts on and perturbations of ecosystem structure, function, goods and services using our current knowledge of ecosystem response to climate variability and the prognosis for future climate change. At present, our ability to make (even simple) predictions about coastal and oceanic ecosystem response to climate change may be hampered by an incomplete understanding of the linkages between them. We know that ecosystems in the Arctic are changing rapidly due to ice melting and resultant changes in habitat, thus we are interested in examples of scenarios for physical forcing and ecosystem change in the Arctic as well as in other geographical regions. Does our current knowledge of climate change allow us to predict shifts in distributions of organisms and/or changes in productivity? What do we know about the ability of organisms to adapt to climate change? What are the options for managing marine ecosystems to sustain goods and services essential to societies? We seek presentations that address these questions as well as regional examples of physical climate change scenarios and the resultant ecosystem responses. We expect that the information presented in this theme will lead to discussion of projected future changes and options for adaptation and mitigation.

S5.1 Scenarios for polar, mid-latitude, sub-tropical, and tropical environments and ecosystems

Convenors: *Sanae Chiba (Frontier Research Center for Global Change, Japan)*
Harald Loeng (Institute of Marine Research, Norway)

Invited speakers: *Graham Hosie (Department of the Environment and Water Resources, Australian Antarctic Division)*
Gordon Kruse (University of Alaska Fairbanks, USA)

There are serious gaps in our understanding of the potential impacts of climate change on the marine ecosystems, and predicting ecosystem responses may prove challenging. Large, long- lived species tend to have very stable populations, so even dramatic changes in juvenile survivorship may not easily be detected for a considerable period of time. At the other end of the size range of organisms, natural variation in population size of phytoplankton is generally large and can mask detection of longer-term trends in abundance. This requires urgent attention in order to make significant progress toward predicting and understanding the impacts of climate change on the marine environment. This session will describe future changes in the marine ecosystem, including distribution, production and biodiversity due to changing climate. We seek papers that focus on ocean currents and transport pathways, vertical stratification and impact on nutrient distribution and phytoplankton production, identification of species sensitivity to climate change (sentinel species), indirect and non-linear effects on biological processes, match/mismatch between predators and prey, and competition when/if new species are introduced into the ecosystem. Ecosystem responses to the common, large scale climatic forcing could vary in respective latitudinal regions due to regionally-specific environmental/ecological characteristics. We hope to contrast especially the mechanisms of ecosystem changes in the polar, mid-latitude, sub-tropical, and tropical regions.

Wednesday 21 May 2008 09:00 - 14:00

09:15 **Eddy C. Carmack**
The changing Northern Ocean (S5.1-4879 Plenary)

10:00 ***Tea/coffee break***

10:30 Introduction by Convenors

10:35 **Graham W. Hosie**
Impacts of climate change on Antarctic marine ecosystems (S5.1-4770 Invited)

11:00 **Gordon H. Kruse, Jie Zheng and James E. Overland**
A scenario approach to forecast potential impacts of climate change on red king crabs in the eastern Bering Sea (S5.1-4778 Invited)

11:25 **Simon J. Walker, Greg A. Skilleter and Bernie M. Degnan**
Predicting the effects of climatic change on the biodiversity of intertidal sessile fauna on coral reefs (S5.1-4631)

11:40 **Teruhisa Komatsu, Atsuko Mikami, Etienne Boisnier, Tatsuyuki Sagawa, Hideaki Tanoue, Tetsuro Ajisaka and Yoshihiko Sakanishi**
Possible change in seaweed distribution in East Asia under a particular scenario of global warming (S5.1-4632)

11:55 **Clarence Pautzke, W. Wiseman and F. Wiese**
North Pacific Research Board and National Science Foundation partner to study biological processes on eastern Bering Sea shelf ecosystem and impacts of climate change (S5.1-4959)

12:10 **Alistair J. Hobday, Elvira S. Poloczanska, Thomas J. Kunz, Tom A. Okey and Anthony J. Richardson**
Getting hot and bothered about climate change impacts in Australian waters (S5.1-4819)

12:25 **Solfrid Sætre Hjøllo, Morten Skogen and Einar Svendsen**
Long term changes in North Sea physics and phytoplankton from NORWECOM (S5.1-4841)

12:40 **Xiuren Ning, Chuanlan Lin, Qiang Hao, Chenggang Liu and Fengfeng Le**
Long-term environmental changes and the responses of the ecosystem in the northern South China Sea during 1976-2004 (S5.1-4864)

12:55 **Jared O. Bosire**
Resilience of mangroves to indirect effects of climate change (S5.1-4548)

13:10 **Fabian Blanchard, Jean-Charles Poulard, Hicham Masski and Claude Roy**
Predicting climate warming impact on marine fish communities from biogeography: example from tropical, subtropical and temperate case studies (S5.1-4919)

13:25 **Kenneth F. Drinkwater, Harald Loeng and S. Sundby**
The ecosystem response of the Barents and Norwegian seas to future climate change with emphasis on the higher trophic levels (S5.1-4952)

S5.1 Posters

S5.1-4515 **Bulent Acma**
Climate changes and tourism: southeastern Anatolia region and southeastern Anatolia Project (GAP) in Turkey as a case study

S5.1-4845 **Anna V. Radovets and Nadezhda K. Khristoforova**
Influence of climatic changes on density dynamics of boreal and subtropical bivalves larvae in plankton of Minonosok Bight (Possyet Bay, Japan/East Sea)

S5.1-4922 **Fengfeng Le and Xiuren Ning**
Effect of *El Niño* Southern Oscillation events on the distribution and abundance of phytoplankton in the northern South China Sea

S5.2 Adaptation and mitigation of impacts on the marine environment and ecosystems

Convenors: *Jane Lubchenko (Oregon State University, USA)*
William T. Peterson (Hatfield Marine Science Center, National Marine Fisheries Service, USA)

Invited speaker: *Marissa Baskett (National Center for Ecological Analysis and Synthesis, University California Santa Barbara, USA)*
Andrew A. Rosenberg (Institute for the Study of Earth, Oceans and Space, University of New Hampshire, USA)

The recent reports of the Millennium Ecosystem Assessment and the IPCC Working Groups II and III included only a minimal discussion of climate impacts on marine ecosystems. This session invites papers that will expand our understanding of climate impacts on marine ecosystems, and on ecosystem services produced. Papers were sought that discuss adaptation, vulnerability, mitigation and the potential for reduction of impacts on coastal and oceanic ecosystems. What are our options for managing marine ecosystems to sustain critical services within both a climate change and an ecosystem management perspective? Will organisms be able to adapt to climate change? What tools are available to increase the likelihood that organisms will adapt and to enhance the resilience of ecosystems to detrimental impacts of changes? Coastal ecosystems such as wetlands, estuaries, intertidal and nearshore habitats, kelp forests, coral reefs and ecosystems surrounding small islands are particularly vulnerable to climate change due to global warming, sea level rise, increased freshwater runoff and storms, and influence of coastal winds. Changes in fish production are expected but may be mitigated by avoiding other ecological stressors such as overfishing and coastal pollution. Networks of marine protected areas and no-take marine reserves may enhance resilience of ecosystems. They may also counter selection pressures for reproduction at smaller size. Fishing practices may need to change to mitigate social and economic impacts of shifting availability of fishes as well as evolutionary changes. Aquaculture ventures will find that rising water temperatures are likely to increase growth rates of some species, but may be detrimental to others. What are the gaps in our knowledge that prevent us from making better assessments of likely outcomes under various climate change scenarios? Is it feasible and wise to consider the ocean as a depository for carbon dioxide either through pumping CO_2 into the deep sea or through massive iron fertilisation experiments?

Friday 23 May 2008 09:15 - 15:45

09:15 **Jane Lubchenco**
Managing for resilience in ocean ecosystems (S5.2-4978 Plenary)

10:00 ***Tea/coffee break***

10:30 Introduction by Convenor

10:35 **Andrew A. Rosenberg**
How can fisheries adapt to a changing ocean climate: beyond ecosystem-based fishery management (S5.2-4949 Invited)

11:00 **Marissa L. Baskett**
Ecological and rapid evolutionary responses to climate change: implications for marine management (S5.2-4710 Invited)

11:25 **Benjamin S. Halpern, Shaun Walbridge, Kimberly A. Selkoe, Carrie V. Kappel, Fiorenza Micheli, Caterina D'Agrosa, John F. Bruno, Kenneth S. Casey, Colin Ebert, Helen E. Fox, Rod Fujita, Dennis Heinemann, Hunter S. Lenihan, Elizabeth M.P. Madin, Matthew T. Perry, Elizabeth R. Selig, Mark Spalding, Robert Steneck and Reg Watson**
A global map of human impact on marine ecosystems (S5.2-4924)

11:40 **Molly McCammonand Josie Quintrell**
Using regional ocean observing systems to develop adaptation tools to respond to climate change effects on the coastal environment (S5.2-4740)

11:55 **Diana L. Stram and Chris Oliver**
Fishery management responses to climate change in the North Pacific (S5.2-4529)

12:10 **Kelley D. Higgason and Maria Brown**
Building local solutions to manage the effects of global climate change on a marine ecosystem: a process guide for place-based resource managers (S5.2-4853)

12:25 **Bayden D. Russell, Jo-Anne Thompson and Sean D. Connell**
Managing local human impacts in marine systems under global climate change (S5.2-4594)

12:40 **Elvira S. Poloczanska, and Anthony J. Richardson**
Marine ecosystems: under resourced, overlooked and under threat? (S5.2-4818)

12:55 **Maria Rebecca A. Campos**
Adaptation of fishing communities in the Philippines to natural risks (S5.2-4549)

13:10 ***Lunch***

14:30 **Ahsan U. Ahmed and S. Neelormi**
Implications of changing sea surface temperature in the Bay of Bengal: livelihoods of coastal fisherfolks in jeopardy (S5.2-4636)

14:45 **Albrecht Götz, Russell Chalmers, Rhett Bennett, Sven Kerwath and Paul Cowley**
Marine Protected Areas as a tool for long-term monitoring of marine biota: separating climate from anthropogenic influences (S5.2-4530)

15:00 **Felix L. Figueroa, N. Korbee and M. Segovia**
Functional indicators monitoring ecological status and vulnerabiliy of marine macroalgae to climate change (S5.2-4754)

15:15 **Dries Van den Eynde, Renaat De Sutter, José Ozer, Stéphanie Ponsar, Katrien Van der Biest, Els Vanderperren, Toon Verwaest and Annemie Volckaert**
Evaluation of climate change impacts and adaptation responses for marine activities: the CLIMAR project (S5.2-4934)

S5.2 Posters

S5.2-4057 **Barbaro V. Moya, Alfedo Cabrera, Lorenzo Castillo and Jose Rojo**
Hicacos penninsula, face to future changes

S5.2-4921 **William T. Peterson, Edmundo Casillas, Cheryl Morgan, Hongsheng Bi and Hui Liu**
Response and adaptation of salmon of the Pacific Northwest and the Columbia River region of the United States (Washington and Oregon) to climate change

W1 Zooplankton and climate: response modes and linkages among regions, regimes, and trophic levels

Convenors: *David L. Mackas (Institute of Ocean Sciences, Fisheries and Oceans Canada)*
Hans Verheye (Marine and Coastal Management, DEAT, South Africa)

Evidence for climate-correlated variability of various components of marine ecosystems has accumulated rapidly over the past two decades. There is a growing recognition of the societal need to learn how climate and ocean environmental and biotic responses are linked, and the likely amplitude and steepness of future changes. Demographic characteristics of marine zooplankton make them especially suitable for examining variability at interannual to decadal time scales. Because zooplankton are rarely fished, their changes in abundance can greatly enhance our collective ability to evaluate the importance of and interaction between 'physical environment', 'food web', and 'fishery harvest' as causal mechanisms driving ecosystem level changes. A number of valuable within-region analyses of zooplankton time series have been published in the past decade, covering a variety of modes of variability including changes in total biomass, changes in size structure and species composition, changes in spatial distribution, and changes in phenology. But because most zooplankton time series are relatively short compared to the time scales of interest, the statistical power of individual local analyses is relatively low. Between-region and between-variable comparisons are needed, and are the mandate of SCOR's Working Group 125 on "Global comparison of zooplankton time series". This workshop will feature several presentations and discussions by WG 125 members, but contributions from other investigators are also welcome.

Sunday 18 May 2008 09:30 - 17:30

09:40 **Todd D. O'Brien, David L. Mackas, Mark D. Ohman, Ángel López-Urrutia and SCOR WG125 Contributors**
The SCOR WG 125 toolkit: issues and methods for analysing zooplankton time series (W1-4768)

10:00 **Todd D. O'Brien, David Mackas, Hans M. Verheye and SCOR WG125 Contributors**
SCOR WG 125: global comparison of zooplankton biomass time series (W1-4767)

10:20

10:40 **David L. Mackas, Anthony J. Richardson, Hans M. Verheye, William Peterson, Sanae Chiba, Gregory Beaugrand, Bertha Lavaniegos and SCOR WG125 Contributors**
Climate-associated latitudinal shifts of zooplankton species and species assemblages (W1-4761)

11:00 ***Tea/coffee break***

11:30 **Hans M. Verheye, Dave Checkley, Sanae Chiba, Young-Shil Kang, Webjørn Melle, Mark D. Ohman, Anthony J. Richardson and SCOR WG 125 Contributors**
Long-term changes in zooplankton community size structure: a global comparison (W1-4946)

11:50 **David Mackas, Wulf Greve, Martin Edwards, Sanae Chiba, Gregory Beaugrand, Aljona Arashkevich and SCOR WG125 Contributors**
Changing seasonal timing of zooplankton populations, and their link to ocean climate (W1-4704)

12:10 **Merja H. Schlueter, Agostino Merico, Karen H. Wiltshire and Wulf Greve**
Long-term changes in zooplankton phenology at Helgoland Roads (W1-4968) - check id number

12:30 **Sanae Chiba, H. Sugisaki, K. Tadokoro, A. Kuwata, T. Kobari, A. Yamaguchi and D.L. Mackas**
Pan-North Pacific synthesis of long-term variation of *Neocalanus* spp. based on stable isotope analysis (SCOR WG125 contribution) (W1-4633)

12:50 **Anthony J. Richardson, Patricia Ayon and SCOR WG125 Members**
Are pelagic systems bottom-up or top-down controlled? (W1-4882)

13:10 ***Lunch***

14:30 **Juha Flinkman, E. Arashkevich, M. Lehtiniemi and S. Viitasalo**
Comparison of early stages of *Mnemiopsis leidyi* invasion into the Black, Caspian and Baltic Seas (W1-4975)

14:50 **Maria Grazia Mazzocchi, Lars Stemmann, Carmen Garcia Comas, Maurizio Ribera d'Alcala, Gregory Beaugrand, Stéphane Gasparini, Frederic Ibañez, Stéphane Pesant, Marc Picheral and Gabriel Gorsky**
Retrospective analysis of zooplankton decadal time series in the western Mediterranean Sea using an automated imaging system (W1-4784)

15:10 **Maria Luz Fernandez de Puelles, Juan Carlos Molinero, Laura Vicente, Ana Morillas and Javier Jansá**
Zooplankton time series related to North Atlantic climate changes in waters of the Balearic Sea: a case of boundary area in the central western Mediterranean (W1-4906)

15:30 **Alessandra Conversi, T. Peluso and S. Fonda-Umani**
The Gulf of Trieste, 1970-2005: a changing ecosystem (W1-4666)

15:50 ***Tea/coffee break***

16:20 **Isabelle Rombouts, G. Beaugrand, F. Ibañez and L. Legendre**
Large-scale geographic variations in diversity of marine zooplankton: theories, environmental controls, and functioning of pelagic ecosystems (W1-4727)

16:50 **Chris Reason, Anthony J. Richardson and SCOR WG 125 Contributors**
Are there teleconnections among zooplankton time series within and between ocean basins? (W1-4883)

17:10 **Harold Batchelder, David Mackas, Todd D. O'Brien and SCOR WG 125 Contributors**
Global zooplankton time series comparisons: where is the synchrony? (W1-4859)

W2/3 Linking Global Climate Model output to (a) trends in commercial species productivity and (b) changes in broader biological communities in the World's oceans

Convenors (part a): *Anne Hollowed (Alaska Fisheries Science Center, National Marine Fisheries Service, USA)*
Richard Beamish (Pacific Biological Station, Fisheries and Oceans Canada),
Michael Schirripa (Northwest Fisheries Science Center, National Marine Fisheries Service, USA)

Convenors (part b): *Thomas A. Okey (Bamfield Marine Sciences Centre, Canada, Canada)*

The goal of the combined workshop will be to facilitate a coordinated international research effort to forecast climate change impacts on the distribution and production of the world's major fisheries, and on the biological communities in which these fisheries are embedded. The specific objectives of the workshop are: (1) to review the activities of existing programmes within each nation, (2) to examine the evidence for climate impacts on production of commercial fish species and other marine life, (3) to discuss the feasibility of developing medium-term to long-term forecasts of climate impacts, (4) to discuss possible responses of commercial fisheries, human communities, and governments to climate-driven changes in marine life, and (5) to identify common or standard approaches to forecasting climate change impacts on commercial species and marine communities and ecosystems.

Workshop attendees will identify climate scenarios for use in forecasting and then discuss development of forecasting tools for use in predicting climate impacts on commercial fish production and broader marine ecosystems. The workshop will provide a forum for discussion of four components needed to complete the forecasts in a timely and coordinated fashion including: IPCC scenarios, predictions of oceanographic impacts, modelling approaches, and regional scenarios for natural resource use and enhancement. The ecosystem component of the workshop will survey a wide variety of approaches including vulnerability assessments for informing location choices for ecosystem modelling efforts and management prioritisation, trophodynamic fishery ecosystem modelling (i.e. Ecopath with Ecosim), climate envelope modelling, statistical approaches, and three dimensional high-resolution biogeochemical ecosystem modelling (i.e. CCC-NEMURO).

Sunday 18 May 2008 09:30-18:00

09:30 Introduction by Convenors

09:40 Round table discussion of existing or planned research

11:00 **Nicholas A. Bond, James E. Overland and Muyin Wang**
A method for using IPCC model simulations to project changes in marine ecosystems (W2/3-4622)

11:30 **Mary E. Livingston**
Climate change, oceanic response and possible effects on fish stocks in New Zealand waters (W2/3-4974)

11:45 **Jae Bong Lee, Anne B. Hollowed, Nicholas A. Bond, James E. Overland, Chang Ik Zhang and Dong Woo Lee**
Forecasting climate change impacts on the distribution and abundance of jack mackerel around Korean waters (W2/3-4935)

12:00 **Sukyung Kang, Jae Bong Lee, Anne B. Hollowed, Nicholas A. Bond and Suam Kim**
Techniques for forecasting climate-induced variation in the distribution and abundance of mackerels in the northwestern Pacific (W2/3-4925)

12:15 **Adriaan D. Rijnsdorp, Joep J. de Leeuw, Lorna R. Teal and Henk W. van der Veer**
Effects of climate change on sole and plaice: timing of spawning, length of the growth period and rate of growth (W2/3-4720)

12:30 **Z. Teresa A'mar, André E. Punt and Martin W. Dorn**
The impact on management performance of including indicators of environmental variability in management strategies for the Gulf of Alaska walleye pollock fishery (W2/3-4540)

12:45 **Michael J. Schirripa, Richard D. Methot and C. Phillip Goodyear**
Simulation testing two methods of including environmental data in stock assessments (W2/3-4862)

13:00 **Alan Haynie**
Climate change and changing fisher behaviour in the Bering Sea Pollock fishery (W2/3-4846)

13:15 **U.K. Singh and P.S. Salvekar**
Large scale circulation over the west Indian Ocean and the south west monsoon (W2/3-4572)

13:30 ***Lunch***

15:00 **Jorge L. Sarmiento, Patrick Schultz, Michael Hiscock and Stephanie Henson**
Modelling the response of ocean biology to climate warming using an empirical approach (W2/3-4757)

15:15 **Taketo Hashioka[y], Takashi T. Sakamoto, Takeshi Okunishi and Yasuhiro Yamanaka[y]**
Future ecosystem changes projected by a 3-D high-resolution ecosystem model (W2/3-4793)

15:30 **William W.L. Cheung, Vicky W.Y. Lam and Daniel Pauly**
Dynamic bioclimate envelope model to predict climate-induced changes in distribution of marine fishes and invertebrates (W2/3-4803)

15:45 **Alistair J. Hobday[y], Thomas J. Kunz, Thomas A. Okey[y], Elvira S. Poloczanska and Anthony J. Richardson[y]**
Informing location choices for ecosystem model development using a vulnerability index (W2/3-4805)

16:00 ***Tea/coffee break***

16:30 **Simone Libralato, Cosimo Solidoro and Villy Christensen**
Towards the integration of biogeochemical and food web models for a comprehensive description of marine ecosystem dynamics (W2/3-4913)

16:45 **Steven Mackinson, G. Daskalov, S.J.J. Heymans, S. Neira, H. Arancibia, M. Zetina-Rejón, D. Lecari, J. Hong, C. Hequin, M. Coll, F. Arreguin-Sanchez, L. Shannon and K. Lees**
Which forcing factors fit? Using ecosystem models to investigate the relative influence of fishing and primary productivity on the dynamics of marine ecosystems (W2/3-4822)

17:00 **Sheila J.J. Heymans**
The effects of climate change on the northern Benguela ecosystem (W2/3-4831)

17:15 Discussion of common approaches and workshop synthesis

W4 Prospects for multidisciplinary long-term ocean observations

Convenors: *Ed Harrison (Pacific Marine Environmental Laboratory, NOAA/PMEL, USA)*
Richard Lampitt (Southampton Oceanography Centre, UK)
Doug Wallace (IFM-GEOMAR, Germany)

Motivated by the need to understand and measure the ocean's role for climate, the physical community has made great strides towards implementation of global and regional ocean observing systems both *in situ* and space-borne. Despite the introduction, three decades ago, of space-borne sensors for ocean colour, the observing systems for ocean biological and chemical properties are significantly less advanced. The motivation for such systems is strong and growing, given the pressures of marine ecosystems and the ocean's significance for carbon sources and sinks. The workshop will help to scope the prospects to allow similar progress concerning observation of biogeochemical properties in the oceans. The outcome of the workshop is intended to feed into a white paper to be presented at an international symposium, OCEANOBS09 (http://www.oceanobs09.net/), to be held in the autumn of 2009. The issues to be addressed follow directly from the principles and practices of GEOSS (Global Earth Observation System of Systems). The 10 year Implementation Plan (adopted February 16, 2005) clearly states that GEOSS "..builds on and adds value to existing Earth observation systems by coordinating their efforts, addressing critical gaps, supporting their interoperability, sharing information, reaching a common understanding of user requirements and improving delivery of information to users." GEO (Group on Earth Observations) includes 68 member countries, the European Commission, and 46 participating organizations working together to establish GEOSS. With these principles and needs in mind, interest groups, existing observing networks, and individuals are invited to exchange and share their visions for a global ocean observing system that addresses key biogeochemical properties of the marine realm.

Wednesday 21 May 2008 TIMES

D.E. Harrison
Ocean variability and trends, and the sustained Global Ocean Observing System (W4-4967)

Christopher L. Sabine, Richard A. Feely, Stacy Maenner and Christian Meinig
High-resolution ocean and atmosphere $\boldsymbol{p}CO_2$ time series measurements from open ocean and coastal moorings (W4-4977)

Martin Visbeck, Johannes Karstensen, Arne Körtzinger and Nicolas Gruber
Prospects for using profiling floats and gliders for biogeochemical sustained observations? (W4-4971)

Richard A. Feely, Christopher L. Sabine and Rik Wanninkhof
Decadal CO_2 uptake by the ocean deduced from the CLIVAR/CO_2 Repeat Hydrography Program (W4-4970)

R.S. Lampitt, K.E. Larkin, S.E. Hartman and M. Pagnani
The role of fixed-point deep ocean observatories in a global observing system (W4-4969)

W4 Posters

W4-4536 **Juliet Hermes, Angus Paterson and Johan Pauw**
Long term monitoring of oceans around Southern Africa

W6 Storm Surges and Flooding in the Baltic Sea

Convenors: *Aleksander Toompuu (Tallinn University of Technology, Estonia)*
Evgueni Kulikov (Shirshov Institute of Oceanology of the Russian Academy of Sciences, Russia)
Josef Cherniawsky (Institute of Ocean Sciences, Fisheries and Oceans Canada)

The Baltic Sea water levels vary over a wide range of temporal and spatial scales. The prevailing winds and river runoff produce a mean sea-surface slope, while intense storms cause flooding in the eastern Baltic. This strong variability and flooding motivate investigations of the physical processes and of quantitative methods for more accurate predictions of extreme sea-level events in the Baltic Sea.

The strongest sea-level oscillations in the Baltic Sea and the most severe floods occur in the Eastern Gulf of Finland (EGF), as storm winds over the Baltic Sea drive large volumes of water into the shallow Neva Bay at the head of the Gulf. A major objective of the ongoing research is development of a reliable system for prediction of sea-level variations and storm surges along the EGF coast. The purpose of this workshop is to facilitate the exchange of information and ideas pertaining to this research, in particular on modelling of the effects of climate change and variability on water levels, storm surges and flooding in the Baltic Sea.

Sunday 18 May 2008 09:30 - 18:00

09:30 **Evgueni A. Kulikov, Aleksander Toompuu and Josef Y. Cherniawsky**
Introduction: storm surges and flooding in the Baltic Sea

I. Observations and analyses of sea level data (Chair: K. Klevannyy)

09:50 **Aleksander Toompuu, Evgueni A. Kulikov and Germo Vali**
Extreme sea level statistics along the Estonian coast (W6-4678)

10:20 **Alexander S. Averkiev and Konstantin A. Klevannyy**
Calculation of extreme water level rises along the western part of the Gulf of Finland (W6-4630)

10:50 **Oleg P. Nikitin and Andrey O. Koch**
Sea level trends along the coast of the Gulf of Finland of the Baltic sea (W6-4733)

11:20 ***Tea/coffee break***

11:30 **Alexander B. Rabinovich and Evgueni A. Kulikov**
On diurnal tidal resonance in the Baltic Sea and Gulf of Finland (W6-4885)

12:00 **Evgueni A. Kulikov, Oleg P. Nikitin and Aleksander Toompuu**
Spectral analysis of sea level in the Gulf of Finland (W6-4681)

12:30 **Josef Y. Cherniawsky, Evgueni A. Kulikov and Oleg P. Nikitin**
Sea level variability and trends from satellite altimetry and tide gauges in the eastern Baltic Sea (W6-4923)

13:00 ***Lunch***

II. Modelling and forecasting of water level (Chair: E. Kulikov)

14:30 **Prof A.V. Nekrasov**

14:50 **Alexey V. Nekrasov and Stanislav D. Martyanov**
Influence of cyclone parameters upon the characteristics of storm surges in Saint Petersburg (W6-4602)

15:20 **Andrey O. Koch and Natalia A. Tikhonova**
Numerical study of wind-driven circulation in the Gulf of Finland with the Regional Ocean Modelling System (ROMS) (W6-4887)

15:50 ***Tea/coffee break***

16:00 **Evgueni A. Kulikov and Isaac I. Fine**
Numerical modelling of the Baltic sea-level variability (W6-4659)

16:30 **Martin Verlaan and Herman Gerritsen**
Model development for flood forecast improvement in the Netherlands (W6-4976)

17:00 **Konstantin A. Klevannyy and Suleiman-Mohammad W. Mostamandi**
Recent improvements in automated flood forecasting system for St. Petersburg (W6-4581)

17:30 Discussion and summary