

**PICES XIII S11-1806 E-poster**

**Research of the interrelation of a sea level deviations and water temperature fluctuations in the northwest part of the Pacific on the satellite information basis**

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The statistical research between the various characteristics of oceanic fields is carried out for 80 stations. For the statistical analysis we used information from October, 1992 to February, 2002. Data on water temperature were obtained from NOAA, JPL and DAAC, while the sea level data were obtained from TOPEX/POSEIDON, ERS-1 and ERS-2.

The maximum correlation (0.85) is observed in the area farthest removed from the Kuril islands with another high correlation (0.75) found over shallow areas near to islands of Kunashir and islands of the Small Kuril ridge. The appropriate temporal shifts in the southeast part of area are insignificant and do not exceed 20 days while temporal shifts are much higher near Kunashir and Shikotan and reach 80 days.

The water temperature spectral frequency has a maximum at the annual period, while the sea levels have the annual period plus additional spectral peaks at periods of 50, 90 and 185 days. The seasonal component dominates the water temperature signal whereas the sea level signal has other components that are determined by other physical laws (for example, the contribution of the steric components, and the contributions determined by dynamic processes).

The analysis carried out on the basis of satellite measurements supports the expressed interrelation between surface water temperature and sea level. Changes of temperature precede changes of a level, proving the presence of the essential contributions of steric processes in the variability of sea level.

**PICES XIII S11-2171 Invited**

**Visualizing pelagic habitat in the Northeast Pacific**

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I present spatial analyses that define pelagic habitat in the Northeast Pacific based upon the density of steep temperature gradients, or fronts, and we quantify their spatial and temporal persistence over a single ENSO cycle (1996-1999) to benefit marine conservation and marine management strategies. I run a moving window over a grid surface of sea surface temperature to calculate slope, and I define a threshold for the steepest slopes in order to isolate temperature fronts. Adjacent steep grid values are transformed to line features, and another moving window calculates the density of frontal features in km/km<sup>2</sup>. A second threshold delimits "high concentrations". The final grid is a monthly binary grid of high concentration, and low concentration. Using map algebra, monthly grids are summed for annual values of persistence between 1 and 12. We find less than <1% of the Northeast Pacific ocean exhibits a persistent (> 8 mo/yr) concentration of temperature fronts (> .2 km/km<sup>2</sup>) within and between years. The Baja California Frontal System (BCFS) is the largest concentration within federal waters, between 20 km and 300 km east of Baja California Sur. Multi-specific habitat functions are associated with the BCFS, including Blue Whales (*Balaenoptera musculus*), Swordfish (*Xiphias Gladius*), Striped Marlin (*Tetrapturus audax*), and Red crabs (*Pleuroncodes planipes*).

**PICES XIII S11-1849 E-poster**

**The technologies of integration of the oceanographic data, tools of their visualization and analysis in internet-based GIS**

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The technologies for the integration of the oceanographic data, tools of their visualization and analysis, realized in corporate GIS of the Far Eastern Branch of the Russian Academy of Sciences (FEB RAS) in the northwestern Pacific, are considered. GIS is based on Internet technologies according to architecture "client – server". Clients are the computers of scientists connected to a high-speed corporate network of scientific institutes of the FEB RAS. The server is the high-efficiency computer processing queries of clients. All GIS data can be divided into three groups: 1 - the data stored in primary database of a GIS-server; 2 - the data on information datastores, located in a corporate network of FEB RAS; 3 - the oceanographic data accessible on the Internet. The GIS-server uses specially developed protocols for interaction with each group of the data, thus the user interface remains common. The GIS-server provides cartographical visualization of the data. It accepts requests from users, translates them into queries to databases, makes spatial transformations, and builds cartographical projections of the data as raster images displayed on a computer of the user. Analytical data processing in GIS is provided at three levels. First, users can access data as files which then can be processed by programs of scientific calculations (Matlab, Scilab, *etc.*). Second, some processing procedures are realized directly on a server-side. Third, the technology of embedding of programs is realized in GIS and such processing executed directly on a computer of the user. Some information and analytical resources are accessible also to Internet users.

**PICES XIII S11-2042 E-poster**

**Immersive visualization of the circulation and biology of the Northeast Pacific using spatially nested model output**

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Immersive visualization techniques are employed to illustrate the 3-D structure of output from a set of spatially nested physical and biological models based on the Regional Ocean Modeling System. This nested set is being used to explore the remote and local influence of the 1997-1998 El Niño on the circulation and temperature fields of the Northeast Pacific, and the lower trophic level dynamics of the Coastal Gulf of Alaska. Elements of this set include a basin-scale model of the North Pacific at ~40 km resolution, a regional model of the Northeast Pacific at ~10 km resolution, and a local model of the Coastal Gulf of Alaska (with embedded NPZ dynamics) at ~3 km resolution. The regional model spans an area from Baja California through the Bering Sea. We have performed a series of sensitivity runs with the regional model, which analyze the effects of 1) hindcast winds as compared to monthly climatological winds (both from the NCEP reanalysis), and 2) hindcast boundary conditions as compared to monthly climatological boundary conditions (both from a hindcast run of the basin-scale model). Results indicate penetration of velocity and scalar anomalies from the basin-scale model into the regional model. Immersive techniques are found to be especially powerful in revealing the structure of spatially patchy fields, which include: 1) physical anomaly fields from our sensitivity experiments; and 2) biological scalars, such as phytoplankton, in the local model.

**PICES XIII S11-1975 E-poster**

**Development of web-based technology for composing comprehensive oceanographic data sets of the East/Japan Sea**

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Continuing interest of society in the global and regional climatic changes concerned with the East/Japan Sea and growing monitoring activities result in a large number of archived and real-time oceanographic data sources distributed over different countries and agencies. One of the key issues of GOOS and regional monitoring programs is the combining of various available data into particular data sets for specific research, operational and forecasting purposes. In this case the technology of Virtual Database (VDB) might be useful for making quick selections of data samples from the different databases. This requires development of the software (technology) that allows combining necessary data samples in a real time mode by simultaneous queries to different sources.

In this work, the oceanographic data provided by NEAR-GOOS data bases, Korean Oceanographic Data Center (KODC) and other available Korean and Russian sources have been used. Merging and blending of these data has been obtained by the VDB technology and Optimal Interpolation using the GMT tools and Virtual IDL Machine as two different approaches. The user's interface was designed as a web-site by the joint efforts of the Chungnam National University and Pacific Oceanological Institute (<http://vdb-eastsea.poi.dvo.ru/>). Such approach to the data processing allow to obtain quickly online comprehensive datasets from different locations and may be used as a helpful tool for analysis of data obtained by the GOOS project.

**PICES XIII S11-1935 E-poster**

**A characterization of pelagic habitat of loggerhead (*Caretta caretta*) turtles in the North Atlantic Ocean**

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For many species of marine turtle, the characteristics that define pelagic habitat have yet to be fully identified. A better understanding of these habitat characteristics is critical to reduce high seas fisheries interactions with turtles, especially since the status of many turtle populations has placed them on the threatened or endangered species list. To gain a more thorough understanding of pelagic loggerhead habitat, we analyzed sea surface temperature, sea surface height anomaly and chlorophyll a values for sites where loggerhead turtles were caught during scientific longline cruises in the Central North Atlantic. The cruises were conducted during the months of May, June, July and August of 2001 and 2002, in an area of the central North Atlantic that is rarely fished. We analyzed the same oceanographic data for satellite-tracked loggerhead turtles from the Eastern North Atlantic, and compared habitat definitions derived by the two different data-collection methods. The analyses indicated that both satellite tracked and incidentally caught turtles were located near oceanographic features such as fronts, possibly due to the high concentrations of prey items at those features. This work showed that satellite tracking and fisheries data can be successfully integrated to identify important pelagic habitats for marine turtles, an approach which can be applied to populations in the Pacific Ocean as well as the Atlantic.

**PICES XIII S11-1788 E-poster**

**Atlas of hydrophysical characteristics of the northeastern part of Kamchatka Peninsula**

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The new electronic atlas contains a summary of many major aspects of the north eastern part of Kamchatka Peninsula regional oceanography and hydrophysics presented as tables, pictures and textual materials. The CD-ROM contains a brief annotated description of information on the main physical-geographical characteristics, peculiarities of hydrological regime, water masses, tidal phenomena and water circulation of the region as well as modern experimental research and modelling results. The atlas contains vast graphic material characterizing the large-scale background peculiarities of distribution and inter-annual variability of the sea water temperature, salinity, sound velocity, Brunt-Vaisala frequency, some hydrochemical elements, tides and internal waves parameters (calculated) and currents. The CD-ROM contains an integrated oceanographic data base, moored current meter data set and software for processing of oceanographic station data. The system provides fast access to selected data stored on CD-ROM, as well as to the other operative or generalized reference information scattered among various sources, and hence, available for wide use. A copy of full version of the CD-ROM is available through the Internet <<http://www.pacificinfo.ru>>.

**PICES XIII S11-1943 E-poster**

**Using Marine Biology ontology for metadata exchange**

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Collected marine biology data are usually treated as proprietary and no direct access for the information retrieval is available. Metadata bases provide data about data that allow one to understand if some data are of interest for a particular purpose. However, it is practically impossible to keep the metadata up-to-date without use of automated procedures.

We propose an architecture and implementation of a prototype of the system for the publication of metadata on the Web with use of a draft of the Marine Biology ontology. The approach allows us to integrate distributed metadata repositories by providing the semantic foundations for translations among different languages and representations.

**PICES XIII S11-1941 E-poster**

**Spatio-temporal dynamics of albacore fishing ground and environmental conditions detected by remotely sensed satellite data**

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Synoptic measurements of satellite sea surface temperature (SST) derived from TRMM/TMI, sea surface chlorophyll (SSC) concentration estimated from SeaWiFS and sea surface height anomaly obtained from AVISO combined with catch data are used to demonstrate spatio-temporal dynamics of potential albacore fishing grounds relative to their environments during winter (November-March) 1998-2000. Results showed that the high CPUEs were obtained in the preferred environmental conditions, SST (18.5-21.5°C) and SSC (0.2-0.35 mg m<sup>-3</sup>), particularly in November. These ranges reflected predicted area where fronts are likely to occur. Altimetry data coincide with high CPUEs concentrated in areas with both cyclonic and anti-cyclonic eddy fields. The predicted areas and eddy fields were defined as "an oceanic hot spots", where biological productivity might be enhanced. In November 1998, the most successful fishing grounds occurred between 34 and 38°N, and between 165 and 170°E, contained an anti-

cyclonic eddy field and then moved into a frontal area and subsequently tended to move toward the cyclonic eddy field. During November 1999 albacore were taken in substantial numbers in areas from 35 to 38°N and from 162 to 172°E with a wider longitudinal band of frontal area and with an eddy field that was less developed. In contrast, in November 2000 the productive fishing grounds tended to be localized in the area of an anti-cyclonic eddy and frontal structures that were less well formed. The center of fishing ground in this period was located near 36°N and 165°E. We have visualized the space-time dynamics of these oceanographic features on the potential albacore fishing ground.

