

an interesting set of depositional fans and distributary channels marked with dune and ripple fields. In some cases there is a clear connection between the on-shore erosional and the off-shore depositional morphology, in other cases the connection is not clear, suggesting either relict topography or an unidentified transport process. The important point is that this combined bathymetric and topographic view of the coastal zone greatly enhances our ability to examine and speculate about nearshore processes in periglacial environments.

OS61A-0209 0830h POSTER

Filling of a Salt-withdrawal Minibasin on the Continental Slope by Turbidity Currents: Futher Research and Results

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We illustrate further research results on the transport and deposition of sediment by turbidity currents in an experimental basin, designed to model salt-withdrawal minibasins found along the northern continental slope of the Gulf of Mexico. The experiment was performed in 2001 in the subsiding EXperimental EarthScape facility (XES) at St. Anthony Falls Laboratory, University of Minnesota. The run consisted of two stages that each contained the same sequence of events, which were of three different variations (1.85-minute pulses of 1.5 liters/s discharges, 3.8-minute pulses of 4.5 liters/s discharges, or 36 minute events of 1.5 liters/s discharges). The sediment comprised three grades of silica with nominal diameters of 20 microns (45%), 45 microns (40%) and 110 microns (15%) and all flows had a volume concentration of sediment of 5%. The only difference between stage I and II was that no subsidence occurred during stage II, and that the 110 micron sand was removed from the flows late in stage II to study the effects of a smaller mean flow-grainsize.

Research since the run has focused on the correction of high-frequency sonar data taken during the run, digital photography taken of dried deposit stratigraphy and grainsize data also taken at various locations in the dried deposit. The sonar data is utilized in the creation of post-event topographies and isopach maps to illustrate what the controls on erosion, deposition, flow path, deposit thickness and even the channelization of early flow events are. Comparisons of the stratigraphy and the grainsize data with the conclusions from the sonar data are made, as sonar is also constructed in a manner that exhibits synthetic or predicted stratigraphy (before compaction). Finally the stratigraphy is structurally described in the proximal, medial, and distal segments of the deposit and comparisons to the field are made.

OS61A-0210 0830h POSTER

Evolution of Sandy Beach Profiles Under Waves

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A quantitative theory is described for the evolution of a sandy seabed under surface water waves. By assuming the slopes of the waves and seabed are comparably gentle, an approximate evolution equation is found for the seabed elevation. The effects of bed load, suspended load and mean beach slope are considered. The wave field and boundary layer structure are calculated. In addition to the effects of bed load previously studied, contributions by suspended load are now taken into account. It is found that the suspended load adds a new forcing mechanism, which includes various correlations between the oscillatory flow and suspended sediment concentration. When the seabed is composed of fine sediment grains, suspended load has a significant effect on sand bar shape, height and crest position. When wave reflection is significant, bars and waves interact through the Bragg scattering mechanism. The dependence of bar morphology on sediment grain size

and other parameters will be examined. Comparison with laboratory experiments will be discussed. When reflection is negligible, sand bars do not form and our theory predicts the long-scale evolution of the seabed profile.

OS61B MCC: Hall D Saturday 0830h

Scientific Advances From Stable Offshore Platforms Posters

Presiding: K Hardy, Scripps Institution of Oceanography; R Pinkel, Scripps Institution of Oceanography; F Spiess, Scripps Institution of Oceanography; F Fisher, Scripps Institution of Oceanography

OS61B-0211 0830h INVITED POSTER

Spar Buoy Laboratories - Origins and Early Realizations

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At least as early as the 1950's there was a realization in the ocean research community of a need for stable platforms that could remain on station in the deep ocean for protracted periods. The 1959 report (Oceanography 1960-1970) of the NAS/NRC Committee on Oceanography includes the recommendation that a manned spar buoy laboratory should be among the new types of research platforms that should be built. By the late 1960s there were at least four craft of this type in operation: Cousteau's Bouee-Laboratoire, US Naval Ordnance Laboratory's SPAR, General Motors Defense Laboratory's POP, and the Marine Physical Laboratory's FLIP. All of these achieved their stability by using relatively deep draft spar buoy configurations. They differed, however, in their design philosophies and thus in their overall dimensions, general configurations, ultimate uses and longevity. Flip has had the longest life of any of the four, for a variety of reasons, but primarily due to its versatility, as attested to in other papers in this session. This paper will discuss the origins, design considerations and careers of these and other similar craft.

OS61B-0212 0830h INVITED POSTER

Challenges in Measuring Air-Sea Interaction: Platforms and Sensors

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Air-sea fluxes of heat, mass (gas and aerosols), momentum and energy are important in constraining the role of the oceans in weather, climate and the major biogeochemical cycles. However, the direct measurement of these fluxes is very difficult, especially in the energetic environment of the air-sea interface during high wind and wave events. The fact that the important fluxes typically scale as some significant power of the wind speed means that very short periods of high winds can contribute as much to the fluxes as very long periods of low winds. While remote sensing of air-sea fluxes has developed significantly over the last two decades, it is still the case that remote sensing algorithms are only reliable in the parameter ranges for which there is good "ground truth". It is especially in the high wind-speed regimes that the algorithms need to be carefully tested against in situ measurements.

The development of platforms and instruments that can withstand the rigors of operating successfully in this environment is an important component of air-sea interaction research. No one platform is universally useful in providing a base for the measurements, and the judicious use of a variety of techniques is required to address the issues of both spatial and temporal coverage in a range of environments. While the development of small autonomous platforms has been very successful, they are not yet at the stage where their computational capabilities and communication bandwidths are sufficient to fully exploit the data that can be collected. In many cases, manned platforms are required, especially during the early stages of the development of new techniques when data acquisition and analysis are exploratory rather than operational. This is particularly the case for modern imaging techniques that generate large amounts of data.

In this paper I will discuss these issues, presenting past efforts and potential future work in the use of

platforms and sensors for the measurement of air-sea fluxes.

OS61B-0213 0830h INVITED POSTER

Air-Sea Interaction Measurements from R/P FLIP

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Soon after its inception, R/P FLIP was used to study the interaction of the atmosphere and ocean due to its unique stability and low flow distortion. A number of campaigns have been conducted to measure the surface fluxes of heat, water vapor and horizontal momentum of the wind with instrumentation as used over land, supported by the Office of Naval Research and the National Science Foundation. The size of FLIP allows for simultaneous ocean wave and mixed-layer measurements as well. Air-sea interaction was a prime component of BOMEX in 1968, where FLIP transited the Panama Canal. The methods used were similar to the over-land Kansas experiment of AFCRL in 1968. BOMEX was followed by many experiments in the north Pacific off San Diego, northern California, and Hawaii. Diverse results from FLIP include identification of the mechanism that causes erroneous fluctuating temperature measurements in the salt-aerosol-laden marine atmosphere, the role of humidity on optical refractive index fluctuations, and identification of Miles' critical layer in the air flow over waves.

OS61B-0214 0830h POSTER

Air-Sea Interaction and Remote Sensing Experiments Using R/P FLIP

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Although the Research Platform FLIP was originally designed for sonar studies, its unique characteristics have made it an ideal platform for experiments using remote sensing techniques to study air-sea interaction. The combination of stability and access to the air-sea interface provides the capability to make a variety of remote sensing measurements simultaneously with direct measurements of the relevant atmospheric and oceanic parameters. When FLIP is freely drifting, the hull rotates so that it is in the same orientation relative to the wind. Judicious use of the variety of booms available for instrument mounting makes it possible to view the sea surface without platform interference. This ability to make continuous measurements regardless of changes in wind direction is a major advantage of FLIP over fixed platforms. A survey of remote sensing measurements made from FLIP will be presented, including a variety of active microwave sensors (radars and scatterometers), passive microwave sensors (radiometers), infrared sensors (radiometers and imagers), and visible sensors (video cameras).

OS61B-0215 0830h POSTER

Observations of Langmuir Circulation From FLIP

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Langmuir circulation has significance across the marine disciplines. Enhanced deepening and inhibited re-stratification can alter the surface temperature and hence net air-sea exchanges. Organization of bubbles into windrows introduces dramatic sound speed variability and also affects air/sea gas fluxes. Organization of seaweed and plankton affects marine life, including pelagic fisheries. Finally, dispersal by Langmuir circulation is a major component in models for oil-spill tracking and for search-and-rescue operations. To get an adequate picture of the forcing and response of Langmuir circulation (and the wind-mixed layer in general), the observations needed include windstress, directional waves, wave breaking, heat and moisture fluxes, stratification (temperature and salinity profiles), velocity profiles across the mixed layer and thermocline, spacing and orientation of windrows, and a measure of the strength of the circulation (e.g., surface rms velocities). These measurements span both the air/sea interface and the thermocline, and must be maintained continuously for many days to span storms and daily, tidal, and inertial cycles. In addition, the total power requirements exceed that comfortably supplied by batteries or local generation by wind or solar energy. It appears that FLIP is uniquely qualified as a platform from which the required range of measurements may all be made. Findings concerning the evolution and dynamics of Langmuir circulation that were facilitated by FLIP are reviewed and summarized, with emphasis on observations from 1990, 1995, and 2002.

OS61B-0216 0830h INVITED POSTER

Langmuir cells, mixed layer evolution, and the search for the Ekman layer

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Making the accurate near-surface velocity measurements needed to both describe and understand the structure and variability of the oceanic mixed layer has challenged oceanographers for many years. Deployment of prototype Vector Measuring Current Meters (VMCMs) from the Research Platform FLIP in the 1970s produced some of the first velocity observations that resolved the vertical structure of upper ocean currents. When the relation between the time series of surface stress and upper ocean currents was examined, the phase angle between the wind-driven flow and the surface wind stress was found to depend on the frequency of the variability as predicted by Ekman theory, though the vertical structure of the mean flow did not in detail match an Ekman spiral. Subsequent cruises on FLIP identified the role of the surface buoyancy forcing in driving diurnal variations in the velocity and density structure of the upper ocean which, when averaged, modified the mean vertical structure of the wind-driven flow near the surface. The relationship of upper ocean structure and the evolution of the mixed layer to the combination wind stress and buoyancy forcing was analyzed and the resulting understanding used as the basis for developing the Price-Weller-Pinkel (PWP) one-dimensional mixed layer model. The model was found to often work well, replicating the temporal evolution of the upper ocean velocity and density structure. Built into the model physics is rapid vertical mixing within the homogenous part of the surface layer. It was hypothesized that the presence of Langmuir cells could provide such rapid vertical mixing; and further work from RP FLIP turned to efforts to first determine if Langmuir cells could be observed, and later to study the role of Langmuir circulation in mixed layer dynamics. A combination of deployments of computer cards to mark surface flow patterns and in-situ acoustic Doppler measurements within the mixed layer showed that Langmuir cells could be visualized and observed. A VMCM modified to measure vertical (w) as well as horizontal velocities showed the circulation could be strong, with w in excess of 20 cm s^{-1} . As techniques to image Langmuir Cells improved, it was found that the circulation was variable in time, with growth and decay modulated by a combination of wind stress and surface wave Stokes drift. Work remains to be done to better understand the dynamics of Langmuir circulation and other influences of surface waves on mixed layer dynamics and to include these processes in mixed layer models.

OS61B-0217 0830h POSTER

Zooplankton in Langmuir Cells Observed from FLIP

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We sought to test the hypothesis of Stommel and others that Langmuir cells (LCs) foster pattern in the distribution and abundance of zooplankton in the open ocean. To this end, one of us (DMC) participated in the 1995 Marine Boundary Layer (MBL) Experiment in which FLIP was deployed in deep water off Monterey in springtime. Atmospheric and wave forcing of LCs was measured by MBL participants. Periodically, we profiled continuously at 1 meter per second for hours to days within the upper ocean with a package containing a CTD and Optical Plankton Counter. Throughout, we deployed a CTD and Acoustic Doppler Velocimeter at a mean depth of 6 then 8 m. On occasion, simultaneous collections were made with a plankton pump and net system and the samples were microscopically enumerated. The resultant data were analyzed for pattern using geostatistics.

Conditions progressed over a period of two weeks from benign, with a stratified upper ocean, to strong winds and high waves, with well-developed LCs, followed by abatement. Forcing was quantified by estimating LC convergent velocity from wind stress and wave height time series. LCs were manifest in the temperature distribution of our profiler data. In particular, in the time-depth domain, sections within LCs showed cool water apparently entrained upward from the base of the mixed layer to the surface. These patterns persisted on the scale of hours. Temperature at a single depth within well-developed LCs varied in a periodic fashion over a range of the order 0.02 deg C. Such measurements provide the physical context in which to interpret our biological observations.

Variograms were used to assess spatial pattern of temperature and plankton. Significant pattern existed for temperature in LCs in the horizontal but not along profiles in the vertical, within the mixed layer, consistent with our observations of LCs in the time-depth domain. The fixed and profiling CTDs yielded consistent time series, confirming the accuracy of the profiler temperature data and, thus, existence of LCs. No significant pattern existed in LCs in the horizontal for zooplankton-sized particles sensed by the profiling OPC. Similarly, no structure, thus pattern, existed in LCs in the horizontal for zooplankton collected with the plankton pump. Conversely, during benign conditions, pattern was evident in the zooplankton sensed by the profiling OPC and collected by the pump.

Residual velocities of LCs we observed in the open ocean appear to exceed the swimming speed of individual zooplankters. Hence, whereas LCs caused pattern in temperature, they mixed the plankton.

FLIP remains a unique and excellent platform for interdisciplinary studies of plankton and air-sea interactions. Future work might use include the use of video to study the plankton and marine snow (particle aggregates) in a range of forcing conditions. Collaboration between the disciplines is enhanced by FLIP's tight quarters.

This work was supported by the Office of Naval Research.

OS61B-0218 0830h INVITED POSTER

Vertical Acoustic Arrays in the Deep Ocean

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The R/P FLIP has made possible the deployments of vertical arrays to study sound propagation and ambient noise in the deep ocean in ways never before possible from existing research vessels. Long vertical arrays can be deployed without the flow noise contamination from platform motion, long a bane for making such studies. The vertical stability of FLIP combined with the deep mooring capability developed by Earl D. Bronson made it possible to deploy multi-element arrays beginning with a versatile 20 element array with variable spacing developed by Bill Whitney in Fred Spies's group.

The 20 element array consisted of bungee mounted hydrophones in metal cages at either uniform spacing or variable spacing to meet directivity or other requirements. It was assembled on station in the vertical and deployed to the desired depths for the elements. Gerald Morris at MPL conducted ambient noise studies using variable spacing of the elements to below the critical depth as well as in the water column above. Vic Anderson used it for his DIMUS processing system for detecting low level signals masked by ambient noise. As a 500 meter array, I used it for a series of CONTRACK (Continuous Tracking of signals at long range) experiments to resolve multipaths so they wouldn't interfere with one another.

The VEKA vertical array developed by Rick Swenson of NORDA was deployed in very deep (below 3300 m) water by Dan Ramsdale of NORDA using the winch and double lay armored cable on FLIP, the same cable system for the MPL 20 element array. In my group Bruce Williams designed a rapidly deployable array to study vertical anisotropy of ambient noise as a function of range from near shore shipping via downslope conversion in a series of 48 hours FLIP stations 350, 1000 and 1500 miles from the Pacific coast.

A short 120 element array, 1000 meters long, was built by John Hildebrands's group for a test of matched field processing and the SLICE experiment in acoustic tomography research of Peter Worcester and Walter Munk in 1987. Later a different 200 element array over 3000 meters long was also built by John Hildebrand's group for deployment in the VAST experiment in 1987. This array included acoustic navigation to measure element location for several different experiments including matched field processing at 1000 km, normal mode studies and down-slope conversion of shipping noise and by Stan Platte of UCSC for looking at long range barotropic wave reflections from Alaska.

In a separate talk, Gerald D'Spain will discuss a trifar (3D) vertical array developed at MPL.

OS61B-0219 0830h INVITED POSTER

A Decade of Ocean Acoustic Measurements from R/P FLIP

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Studies of the properties of low frequency acoustic fields in the ocean continue to benefit from the use of manned, stable offshore platforms such as R/P FLIP. A major benefit is providing the at-sea stability required for deployment of extremely large aperture line

arrays, line arrays composed of both acoustic motion and acoustic pressure sensors, and arrays that provide measurements in all 3 spatial dimensions. In addition, FLIP provides a high-profile (25 m) observation post with 360 deg coverage for simultaneous visual observations of marine mammals. A few examples of the scientific results that have been achieved over this past decade with ocean acoustic data collected on FLIP are presented. These results include the normal mode decomposition of earthquake T phases to study their generation and water/land coupling characteristics using a 3000 m vertical aperture hydrophone array, simultaneous vertical and horizontal directional information on the underwater sound field from line arrays of hydrophones and geophones, the strange nighttime chorus behavior of fish measured by 3D array aperture, the mirage effect caused by bathymetry changes in inversions for source location in shallow water, and the diving behavior of blue whales determined from 1D recordings of their vocalizations. Presently, FLIP serves as the central data recording platform in ocean acoustic studies using AUV's.

OS61B-0220 0830h POSTER

Microwave and Electro-optical Transmission Experiments in the air-sea Boundary Layer

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Microwave and electro-optical signal propagation over a wind-roughened sea is strongly dependent on signal interaction with the sea surface, the mean profiles of pressure (P), humidity (Q), temperature (T), wind (U) and their turbulent fluctuations (p, q, t, u). Yet, within the marine surface layer, these mechanisms are not sufficiently understood nor has satisfactory data been taken to validate propagation models, especially under conditions of high seas, high winds, and large surface gradients of Q and T. To address this deficiency, the Rough Evaporation Duct (RED) experiment was designed to provide first data for validation of meteorological, microwave, and electro-optical models in the marine surface layer for rough surface conditions including the effects of surface waves.

The RED experiment was conducted offshore of the Hawaiian Island of Oahu in late summer, mid-August to mid-September, of 2001. R/P FLIP, moored about 10 km off of the NE coast of Oahu, hosted the primary meteorological sensor suites and served as a terminus for the propagation links. There were eleven scientists and engineers aboard R/P FLIP who installed instruments measuring mean and turbulent meteorological quantities, sea wave heights, directions, and kinematics, upward and downward radiance, near surface bubble generation, atmospheric particle size distributions, laser probing of the atmosphere, and sources for both microwave and electro-optic signals. In addition to R/P FLIP, two land sites were instrumented with microwave and electro-optic receivers and meteorological sensors, two buoys were deployed, a small boat was instrumented, and two aircraft flew various tracks to sense both sea and atmospheric conditions. In all, more than 25 people from four countries, six universities, and four government agencies were directly involved with the RED experiment.

While the overall outcome of the RED experiment is positive, we had a number of major and minor problems with the outfitting, deployment, operation, and recovery of R/P FLIP. These problems ranged from the U.S.N.S. Sioux cutting a mooring line, which delayed deployment by more than 4 days, nearly losing Tommy during the first attempt at deployment, inadequate air conditioning in the lab spaces, causing at least one instrument to temporarily fail, and problems associated with too many people and too many sensors on board. These issues will be discussed and recommendations will be made to improve future microwave and electro-optical experiments at sea.

URL: <http://sunspot.spawar.navy.mil/red>

OS61B-0221 0830h INVITED POSTER

Internal Waves, Reference Frames and the Search for Intrinsic Frequency

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For the past 40 years, internal wave and fine-scale fields have been studied using a variety of spectral techniques. Frequency spectra of vertical displacement and horizontal velocity appear to be continuous, with the addition of discrete nearinertial and tidal peaks. When the combined space-time variability of the fields is tested against linear internal wave theory, agreement is generally poor. An added "vortical" or "fine-structure" field is often invoked to explain observations.

Working from deep-sea stable platforms both in the Arctic (the polar ice cap) and the open ocean (FLIP), recent data suggest that much of the continuous nature of the internal wave frequency spectrum results from simple Doppler shearing of a few principal spectral constituents. The apparent role of the vortical field is dependent on the reference frame in which observations are made. Such observations encourage revision of our view of the spectral cascade of energy from large to small scales.

OS61B-0222 0830h INVITED POSTER

Biogeochemical and Bio-optical Measurements from Stable Platforms and the Coming Ocean Observatories

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Problems such as global climate change, carbon and biogeochemical cycling, upper ocean ecology, biomass and bio-optical variability, waning fisheries, population dynamics, and generally ocean prediction are hindered by insufficient time series data. These problems and others require interdisciplinary data that need to be collected simultaneously and effectively span ten orders of magnitude in time. New technologies are enabling interdisciplinary sampling of the ocean at unprecedented time and space scales. Autonomous sampling of interdisciplinary variables using platforms including stable platforms such as R/P FLIP, moorings, drifters, profiling floats, gliders, and autonomous underwater vehicles (AUVs) has become a major emphasis of observational oceanography. Autonomous measurements now include several key chemical, bio-optical, and biological variables. Moorings and R/P FLIP have been used to test sensors and systems, which have been, or likely will be, transitioned to other autonomous sampling platforms. A natural extension of this work is to future stable platforms and observatories. Some examples of interdisciplinary time series results obtained during with suites of sensors are presented. Visions of new sensor technologies and a network of integrated, interdisciplinary, global-scale, three-dimensional time series observations using multiple platform-types including stable platforms and observatories and modeling are presented. Ongoing international efforts and plans for implementation of an array of platforms and observatories equipped with interdisciplinary sensors will be described.

URL: <http://www.opl.ucsb.edu>

OS61B-0223 0830h INVITED POSTER

Stable platform designs for global DEOS moorings

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Oceanography has been dominated for at least two centuries by an expeditionary approach and examples include the voyage of the Beagle in 1831-1836 and the Challenger Expedition in 1872 - 1876. In the U.S., the capabilities for expeditionary research were greatly amplified during and especially following WW II. Today the U.S. alone has established a research fleet of 28 vessels organized through UNOLS. While experimental oceanography has made enormous contributions over the decades and centuries, this approach has not been well suited to investigating processes in which transients are important. The Dynamics of Earth and Ocean Systems (DEOS) program was developed in 1997 to promote the idea of making long-term observations in the oceans - to establish a long-term presence in the oceans. DEOS, now under the sponsorship of the Consortium for Ocean Research and Education (CORE) with support from the NSF, advocates the collection of long-term time-series data with the recognition that this is the only viable approach to observe transients and changes and to enhance the signal-to-noise ratio of weak signals. Moored ocean buoys are a technically feasible approach for making sustained time series observations in the oceans and will be an important component of any long-term ocean observing system. Scripps and Woods Hole developed the ocean mooring systems, designed for decadal time scales, in an NSF-sponsored design study. One of the designs bears a strong familial resemblance to R/P FLIP and is especially well suited for maximizing system life as well as ensuring robust Internet connectivity. I will review this design and describe feasibility experiments conducted to test communications feasibility. Because of the broad spectrum of scientific needs identified during planning, it is clear that there is no single buoy or mooring design that will meet all of these needs while at the same time

minimizing costs. An alternative British design may be particularly well suited for high latitude deployments. Ongoing experiments to demonstrate components of the mooring program will be discussed.

URL: <http://roadnet.ucsd.edu>

OS61B-0224 0830h INVITED POSTER

FLIP II - Concept Designs to Meet Future Scientific Mission Requirements

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R/P FLIP has successfully operated for 40 years in support of important oceanographic research missions. The simple platform, which has the unique ability to provide a heave-stable operating location in open ocean environments, has over time been modified and upgraded. Its capability has been extended to the physical limits imposed by buoyancy and stability constraints. Nonetheless, there are oceanographic research operations that can use FLIPs unique characteristics, but which exceed its capabilities. Over the years researchers at the Marine Physical Laboratory of Scripps Institution of Oceanography have led investigations into second generation heave-stable ocean platforms with capabilities substantially exceeding those of R/P FLIP. This paper discusses several design concepts that have been developed. The designs are presented in terms of the ability to meet current and future scientific mission requirements.

URL: <http://www.glosten.com>

OS61C MCC: 274 Saturday 0830h

Data Integration, Publication, and Archival (DIPA) I (joint with GP, V)

Presiding: J Helly, University of California, San Diego; D Chayes, Lamont-Doherty Earth Observatory of Columbia University

OS61C-01 0835h INVITED

Data Integration Across the Geoscience Disciplines: Challenges and Opportunities

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As geoscience research becomes more interdisciplinary and integrative, it is also becoming increasingly dependent on rapid access to reliable information. Some of these data sets are extremely large and new data sets are being developed. Interoperability among data sets is of paramount importance and researchers are pushing for the development of new analytical tools. To better understand the full range of earth processes, community models and new theoretical frameworks are being developed that require increased computational capabilities. Within the NSF Geoscience Directorate, the three divisions (Earth, Atmospheric, and Ocean Sciences) are working with their communities to formulate informatics programs. Whereas each division serves distinct communities, the various disciplines have overlapping informatics needs that require a mechanism to serve both their specific requirements as well as one that promotes synergy among the sciences.

For the Earth Sciences community, there is a natural division into at least four earth science-based informatics groups: 1) solid earth geophysics and active tectonics; 2) continental crustal evolution and architecture; 3) surficial processes and hydrologic sciences; and 4) sedimentary and ancient life systems. In addition, education-outreach and computational technology are critical parts of the overall system. Each of these components encompasses several ongoing or developing informatics efforts, such as those by IRIS, EarthScope, several NSF Information Technology Research (ITR) grants, GERM, NAVDAT, the Hydrologic Information System (CUAHSI), the Community Sediment Model (CSM), CHRONOS, and many others. GEON (A Research Project to Create Cyberinfrastructure for the Geosciences) is an ITR NSF project that perhaps forms a core part of the computational facilities for the earth sciences and it includes some science-based projects that are encompassed in the respective discipline based groupings.

Neither the names or the "membership" in these topical groups are firmly establish. Furthermore, because informatics must reflect and serve the community

needs, everyone who has an interest in or need for informatics must be provided an opportunity to become part of the effort. On the other hand, we must have a limited number of science-based categories or the funding and coordination of efforts becomes untenable.

It is important to emphasize that there are clear overlaps between these earth science-based efforts and similar to parallel ones in the ocean and atmospheric sciences. The PETDB and ODP's Janus databases are two such academic-based examples that connect the earth science and oceanographic communities. Atmospheric and hydrologic scientists are working to bridge their information systems. Similarly, a need to cross the interface between the geosciences and the ecosystem and modern life sciences is being articulated. Representatives from federal and state agencies and industry sit on many of subdiscipline organizing and steering committees. The important point is that the scientists are the ones articulating the need for this informatics integration, and therefore it appears that informatics is becoming a bottom-up driver for better overall science integration.

OS61C-02 0850h INVITED

Data Collection and Distribution within the IRIS Data Management System: Embracing New Technologies

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The IRIS Data Management Center in Seattle has been instrumental in addressing the needs of a global community as it relates to the collection and distribution of seismological data. We will focus on approaches that support distributed models of data management that leverage local expertise and resources.

We will offer examples of how effective archiving can be accomplished when standards are first adopted and accepted by a large international scientific community, and what the time scale was to accomplish this. We will offer suggestions on topics such as how to manage real time data streams, managing restricted data, how to insure proper credit is given to data providers and data versioning.

We will discuss our current Information Technology (IT) initiatives that directly relate to distributed data access, including observational time series and metadata. We will summarize the concept of Networked Data Centers (NetDC), which connects globally distributed data centers with common interface utilities and eliminates the need to know where data are archived. We will also highlight the FISSURES initiative that includes the Data Handling Interface (DHI), a comprehensive effort to leverage industry-standard CORBA technology to standardize the interfaces to information in distributed data centers.

URL: <http://www.iris.washington.edu>

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User-Friendly Data Servers for Climate Studies at the Asia-Pacific Data-Research Center (APDR)

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The APDR was recently established within the International Pacific Research Center (IPRC) at the University of Hawaii. The APDR mission is to increase understanding of climate variability in the Asia-Pacific region by developing the computational, data-management, and networking infrastructure necessary to make data resources readily accessible and usable by researchers, and by undertaking data-intensive research activities that will both advance knowledge and lead to improvements in data preparation and data products. A focus of recent activity is the implementation of user-friendly data servers.

The APDR is currently running a Live Access Server (LAS) developed at NOAA/PMEL to provide access to and visualization of gridded climate products via the web. The LAS also allows users to download the selected data subsets in various formats (such as binary, netCDF and ASCII). Most of the datasets served by the LAS are also served through our OPeNDAP server (formerly DODS), which allows users to directly access the data using their desktop client tools (e.g. GrADS, Matlab and Ferret). In addition, the APDR is running an OPeNDAP Catalog/Aggregation Server (CAS) developed by Unidata at UCAR to serve climate