AN: OS23B-1263
TI: Indian Ocean Kelvin waves in the Indonesian Throughflow Exit Passages
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AB: Equatorial Kelvin waves generated by westerly wind anomalies over the central Indian Ocean propagate eastward to Indonesia, where they can enter the outflow passages of the Indonesian Throughflow (ITF) and affect transports of mass and heat. This has potential consequences for local thermohaline properties and may also be related to larger scale climate modes such as the Indian Ocean Dipole (IOD) and Madden-Julian Oscillation (MJO). Moorings were deployed in Lombok and Ombai Straits, two ITF exit passages, as part of the three-year International Nusantara STratification ANd Transport (INSTANT) program. These data provide the first comprehensive, full-depth, high-resolution measurements of velocity and temperature in the exit passages and have allowed us to thoroughly characterize the properties of Kelvin waves in the throughflow region. Here, we discuss the relationship between ITF Kelvin waves and the structure and timing of the wind forcing over the Indian Ocean. Specifically, we focus on the partitioning of Kelvin wave energy between the ITF outflow passages, mode-1 versus mode-2 vertical structure of the Kelvin waves, and the connection between wind forcing, MJO, IOD, and monsoon dynamics.

AN: OS13B-1179
TI: Air-sea Fluxes in Subantarctic Mode Water and Antarctic Intermediate Water Formation
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AB: Recent observed freshening of Antarctic Intermediate Water (AAIW) may signal the continued onset of climate change. However, the implications of this freshening are difficult to deduce without knowledge of AAIW's formation mechanisms. Two hydrographic surveys from the Southeast Pacific Ocean provide high quality, synoptic views of the Subantarctic Mode Water (SAMW) and AAIW formation region during winter and summer. The winter cruise, from August 23 to October 5, 2005, occupied 135 full depth CTD/Rosette stations and deployed 371 XCTDs. This data set is used to assess the role of atmospheric forcing in forming the deep SAMW and AAIW mixed layers. Forty-two SAMW mixed layers deeper than 400 m were observed on the winter cruise. The mixed layer potential density varies by 0.05 kg $m^{(-3)}$ along the front, such that two clusters of deep SAMW mixed layers are visible in T-S diagrams. The deepest mixed layers occur immediately north of the Subantarctic Front (SAF) and are associated with oceanic heat loss to the atmosphere (maximum of 250 W $m^{(-2)}$). To assess the importance of air-sea fluxes in SAMW and AAIW formation, the observed fluxes are used to verify model heat fluxes (NCEP and ECMWF). The model fluxes are compared to backwards heat flux calculations and used to force a one-dimensional mixed layer model, KPP, to model the mixed layer's seasonal cycle and examine the down-front changes in SAMW. This analysis is contrasted with a preliminary examination of cross-frontal transport and its effect on the deep SAMW and AAIW mixed layers.

AN: OS53F-06
TI: Alongshore Variability of Shoreline Change and Geologic Factors
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AB: Scripps Institution of Oceanography, 9500 Gilman Drive, La Jolla, California 92037 Biannual airborne lidar surveys along 80 km of southern California shoreline show high alongshore variability in the magnitude of the seasonal cycle of sand levels on the exposed beach (above the low tide waterline). Wave energy, estimated hourly at 100 m alongshore intervals on the 10-m depth contour using directional wave buoys and a spectral refraction model, also varies seasonally. Winter storms cause beach face erosion, and lower summer waves cause beach face accretion. However, the alongshore variability in seasonal shoreline change is larger than the alongshore variability in the seasonal wave field. For example, along a 20 km alongshore span, seasonal variation in MSL contour location (e.g. subaerial beach width) decreased from approximately 30 m at Camp Pendleton to less than 5 m at San Onofre, while the seasonal wave field showed little alongshore variation. Monthly ground-based surveys of the exposed beach confirm the observations of the less frequent lidar surveys, showing large shoreline change at Camp Pendleton and a stable shoreline at San Onofre. Approximately four times yearly full bathymetry (to 10 m depth) ground-based surveys show large seasonal fluctuations in deeper bathymetry, with approximately 20 m of seasonal contour movement at both sites. Thus, at San Onofre the seasonal wave field drives large seasonal changes in depth contours between 3-7m below MSL, but the shallower contours are stable. In contrast, at Camp Pendleton the largest seasonal changes are at the shoreline. Sand grain size analysis along 18 cross-shore profiles in the 20 km alongshore span indicates that cross-shore sand grain size variation influences the magnitude of seasonal fluctuations. Additionally, the effects of cobbles, exposed bedrock, cliff inputs, and offshore sand supply may contribute to the alongshore variability of shoreline change, but the effects are not yet quantified.

AN: OS13C-1199
TI: Structure of the Antarctic Circumpolar Current in Drake Passage From Direct Velocity Observations
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AB: The structure of the Antarctic Circumpolar Current (ACC) in the upper 1000~m of Drake Passage is examined using nearly three years of shipboard Acoustic Doppler Current Profiler (SADCP) velocity data from a 38~kHz Ocean Surveyor mounted in the hull of the Antarctic supply vessel ARSV Laurence M. Gould. The principal fronts of the ACC are clearly visible, with the Subantarctic Front (SAF) and Polar Front (PF) jets having widths of about 100~km and 150~km, respectively. Depth-mean current speeds in the SAF and PF jets are ~40~cm~s^{-1}, while the eddy kinetic energy (EKE) has a maximum of ~700~$cm^2 s^{-2}$ between the PF and the SAF. Horizontal-wavenumber velocity spectra peak at ~350~km. These numbers are similar to surface-layer values found by Lenn et al. (J. Mar. Res., 2007). The transport estimated from the mean section between the surface and 1030~m is ~100~Sv, or about 70% of the canonical total transport. The extended depth range available from the 38~kHz instrument allows us to investigate the depth structure of the current. The mean current is largely

barotropic, while EKE and shear variance exhibit strong depth dependence. In cross-sectional averages current shear is small and nearly constant to 600~m, below which depth the current speed drops off more quickly; mean jet speeds are around 50~cm~s^{-1} at 46~m (the first depth bin) and 20~cm~s^{-1} at 1030~m. Various possibilities for a vertical structure function are explored. EKE is intensified above 600~m between the SAF and PF. Shear variance is strongest in the surface layer. Vertical-wavenumber spectra of currents and current shear reveal negligible rotation. Through-passage currents have more energy at the lowest vertical wavenumbers (wavelengths of ~1000~m), while at scales smaller than ~100~m, energy in across-passage currents is greater.