Major findings

⇨ Surface fluxes

- Using direct observations to evaluate COARE3.0 bulk formula (James B. Edson et al.); COARE3.0 overestimates the latent and sensible heat fluxes during weak wind and rainy conditions
- Inter-comparing in-situ observations, products derived from satellite retrievals and model (June Marion et al.); OAFLUX agrees well with PSD at Revelle site; while the fluxes from COAMPS model has very low correlation and large RMSE with the PSD.
- Using observations from Revelle and RAMA to validate Renalysis datasets (CFSR, MERRA, ERA-Interim) (Wanqiu Wang et al); Large uncertainties exist in individual reanalyses, and the Reanalysis Ensemble Mean (REM) gives best match with the observations

⇨ Upper Ocean Processes

- **Assessment of mixed-layer heat budget** has been attempted at 1.5^{o}S (Nan-Hsun Chi et al.); shortwave radiation and latent heat are two dominant terms with large residuals (better estimates of entrainment and temperature advection are needed)
- LES driven with surface observations from the Revelle has been attempted to simulate upper ocean mixed-layer (Martin Hoecker-Martinez et al.)
- **Characters of cool/fresh lenses from heavy rain** (Aurelie Moulin et al.); Relationship with barrier layer and contributions to MLD heat budget and SST?

Major findings

⇨ Upper Ocean Processes

- Westerly wind bursts (WWBs) and precipitation associated with Nov. MJO freshen the upper ocean and enhance mixing and Yoshida/Wyrtki jet, leading to 1^{o}C SST reduction (Jim Moum et al.) at Revelle site
- **Regional ocean models are used to study** the impacts of near-inertial waves on thermocline mixing (Natarov et al.), the rectifiction of MJO on upper ocean mean states (Daeho Jin et al.), the remote effects of MJO on Indonesian through-flow (Toshiaki Shinoda et al.)
- Observations are used to characterize upper-ocean evolution (Qing Wang et al.), to study the *changes of stratifications* , vertical shear and associated internal wave spectrum (San Nguyen et al.) as well as the changes of chlorophyll-a concentrations, solar transmission coefficients, and implications for upper-ocean dynamics and air-sea exchange (Carter Ohlmann)
- Processes (surface fluxes, stratification, mixing) controlling SST changes at Mirai site are evaluated (Kelvin Richards et al.); *Zonal advection is a dominant term in the MLD heat budget and is responsible for a sudden cooling around Nov 11*
- Seychelles-Chagos thermocline ridge (SCTR) migrates from 9S to 4S prior to Nov MJO (Toshiaki Shinoda); two types of equatorial waves (Rossby and Yanai waves) are observed at (EQ, 80E) below EUC (Bill Smyth and J. Moum)

Future Studies

- Utilize DYNAMO/CINDY products (e.g., surface fluxes, MLD budgets) *to validate models*
- Process and modeling studies to advance understanding of the processes governing the upper ocean thermo- and dynamics (e.g., stratification, SST, MLD budget) and atmospheric cold pool, MCS and MJO evolutions.

Questions

⇨ What are the major processes controlling SST evolutions from diurnal to intraseasonal time scales? The relative roles of surface fluxes, barrier layer/mixed-layer depth, vertical mixing in the ML and thermocline layer, and advections; as well as the SCTR?

⇨ What are the major processes controlling surface heat fluxes and their interactions with atmospheric cold pools/MCS at various stages of the MJO. How will SST and surface fluxes affect the evolutions of MJO?