#### CANON / ECOHAB San Pedro Bay Experiment Some observations from the first phase of the intensive (15-19 March 2013)

### 1. Surface conditions

Satellite ocean color and temperature coverage during 15-17 March was poor. Beneath the clouds and fog, the underway mapping system on the R/V Carson detected a near-surface cool, chlorophyllenriched plume extending along the outer shelf (Fig. 1). Although spatial and temporal variation are somewhat smeared in this 3-day composite, each day individually showed a similar pattern of warmer waters on both sides of the cool outer shelf plume.



**Fig. 1**. Surface properties from the R/V Carson underway mapping system (intake at  $\sim 1.5$  m). Ranges are 12.9 to 14.4°C for temperature, 33.1 to 33.57 for salinity, and 1 to 14 mg m<sup>-3</sup> for chlorophyll.

The generation of an upwelling plume is consistent with the moderate upwelling favorable winds observed in the central Southern California Bight, which were largely persistent during the two days before the start of these cruises (Fig. 2).



Fig. 2. Winds at NDBC Station 46025. Time is UTC. R/V Carson operations began on 15 March.

# 2. Conditions at the ESPs

The cool plume evident in surface properties (Fig. 1) is reflected in the temporal variability observed at the ESPs (Fig. 3). The cooling trend began ~March 14-15. Salinity increases lagged temperature by ~ 1 day, consistent with wind-driven mixing dominating the early response followed by influx of recently

upwelled waters carrying a salinity signal. Physical changes were more pronounced at Bruce (outer shelf). While temperature variation at the two sites had somewhat similar frequency and timing characteristics, salinity and chlorophyll variation were markedly different between the two sites. Due to its depth, Mack saw the low salinity event later than it was detected near the surface by WireWalker (see Drew's summary). Due to its depth, Bruce did not see this feature.



**Fig. 3**. Time series at Mack (red, mid-shelf /  $\sim$ 9 m) and Bruce (blue, outer shelf /  $\sim$ 24 m).

The Dorado sections of March 15 and 17 show cooling across the shelf as well as indications of offshore advection of phytoplankton from the shelf. Toggle between:

http://dods.mbari.org/data/auvctd/surveys/2013/images/Dorado389\_2013\_074\_02\_074\_02\_2column.png

and

http://dods.mbari.org/data/auvctd/surveys/2013/images/Dorado389\_2013\_076\_01\_076\_02\_2column.png

### 3. Pseudo-nitzschia

Data from the ESPs, and microscopy from many samples (thanks Holly!) indicate a moderate upward trend in *Pseudo-nitzschia* and DA. This is consistent with the relatively weak physical anomalies of this event. For example, mean temperature dropped  $\sim 1C$  at Bruce during this event, compared to  $\sim 4C$  in the spring 2010 event, which was accompanied by a sharp rise in *Pseudo-nitzschia*.

# 4. Circulation

The drifters released at the ESPs on March 16 went north. This suggests a cyclonic shear eastward across the plume and shelf. The underway mapping data (Fig. 1) are consistent with this. During the next 3-day operations block, we will deploy additional drifters to better characterize circulation patterns.