

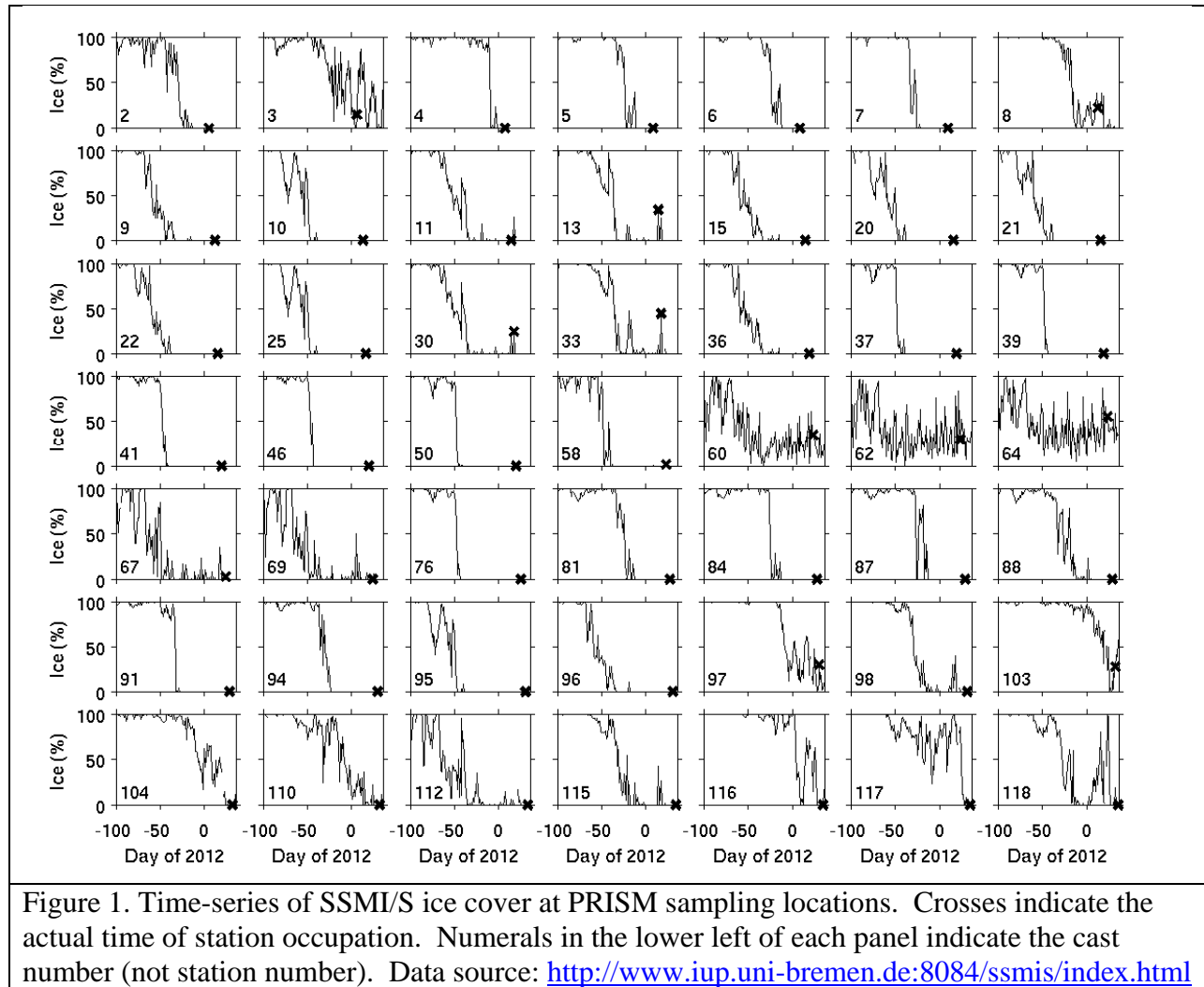
## **PRISM Observations: context from SSMI/S and MODIS**

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Satellite measurements from SSMI/S were used to construct a time-series of ice cover at each of the PRISM sampling locations (Figure 1). Although most PRISM sampling was conducted in ice-free waters, that was not always the case. For those stations that were occupied in ice-free water, the SSMI/S data can be used to estimate the length of time waters at that location had been ice free at the time of sampling.

Time-series of chlorophyll were extracted for each PRISM station from daily composite 1km resolution MODIS images (reprocessing 2012.0), and compared with *in situ* chlorophyll measurements from the shallowest Niskin bottle in each case (Figure 2). From the time-series data it appears MODIS systematically underestimates *in situ* chlorophyll, and a linear regression using “simultaneous” (same-day) measurements confirms this to be the case (Figure 3). There is a highly significant linear relationship between the two ( $r^2=0.94$ ;  $p=0.00007$ ), with the *in situ* chlorophyll roughly a factor of 3.6 higher than the satellite measurement. Expanding the time window for satellite/*in situ* matchup to  $\pm 1$  day adds considerable scatter (not shown).

Although cloudiness and sea ice obscure the sampling locations for varying amounts of time, the MODIS data provide valuable context for interpreting the *in situ* data. For example, whereas many of the early stations captured peak bloom conditions (e.g. casts 5-9), such was not always the case: cast 10, sampled immediately after station 9, was located in the low-biomass environment of the central Ross Sea (Figure 4) in which the bloom peaked on month prior. In some cases, such as the area sampled immediately adjacent to the Ross Ice Shelf (casts 60, 62, and 64) there is no bloom evident in MODIS data.



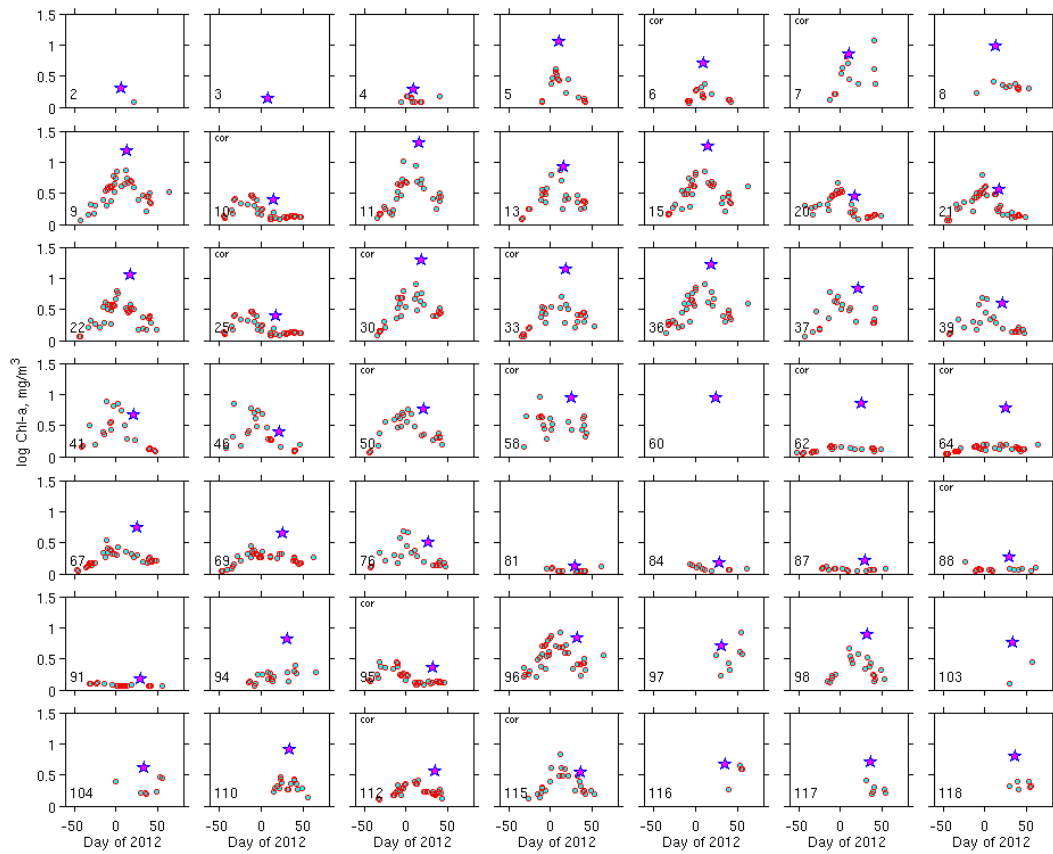


Figure 2. Time-series of MODIS (circles) and in situ (stars) chlorophyll at PRISM sampling locations. Numerals in the lower left of each panel indicate the cast number (not station number).

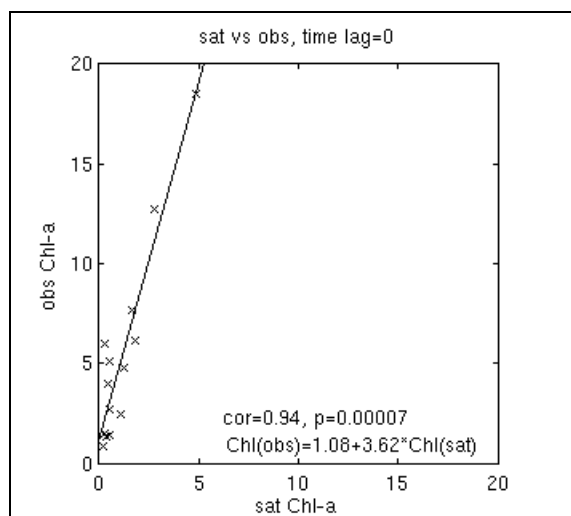


Figure 3. Satellite versus *in situ* chlorophyll (Niskin bottle closest to the surface) for same-day measurements.

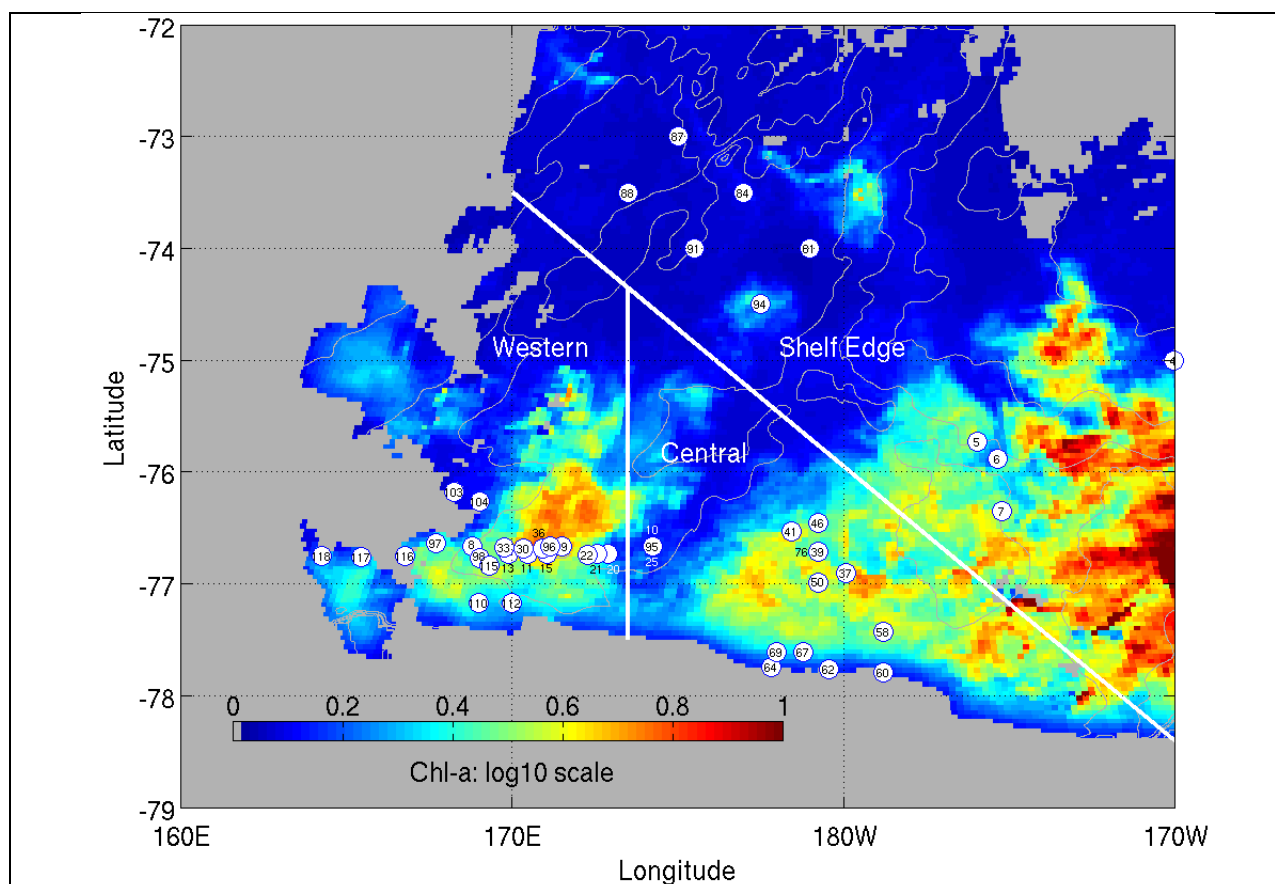


Figure 4. Station positions overlayed on a MODIS composite chlorophyll-a image for January 2012. Numerals refer to cast numbers.