ICES/PICES Theme Session M
Identifying mechanisms linking physical climate and ecosystem change: Observed indices, hypothesized processes, and "data dreams" for the future

Conveners:
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Climate variability and change in the ocean is now recognized as a significant driver of marine ecosystem response, from primary production to zooplankton composition, and through the trophic chain to fish, marine mammals, and other top predators. Past studies have often relied upon existing datasets to draw correlative conclusions (associated with indices and discovered time-lags in the system) regarding the possible mechanisms that may control these linkages.

In the proposed session, we focus on studies that seek to identify and model key processes that enable us to succinctly and quantifiably explain the mechanisms underlying the correlative relationships in physical–biological datasets, both in the North Pacific and North Atlantic. The description and modelling of these key processes may (a) involve few or several variables (but not full complexity), (b) use dynamical (e.g. eddy-resolving ocean models, NPZD, IBM, etc.) or statistically based methods (e.g. Bayesian, linear inverse models, etc.), (c) explain variability in low or high tropic levels (although we seek to emphasize secondary and higher producers), and (d) include uncertainty estimation.

We also solicit ideas and hypotheses concerning new mechanisms of physical-biological linkages that can only be tested by establishing novel long-term observational strategies, where the harvest of understanding will eventually be reaped by future generations of ocean scientists, as well as by developing creative modeling datasets, where ecosystem complexities can be effectively unraveled.

The session builds on the co-sponsored GLOBEC/PICES/ICES workshop WKECOFOR on "Forecasting ecosystem indicators with process-based models" (http://wg27.pices.int/ecofor) held at Friday Harbor Labs in September 2012.