Impact of new ocean data assimilation on seasonal prediction of the Indian Ocean Dipole and ENSO

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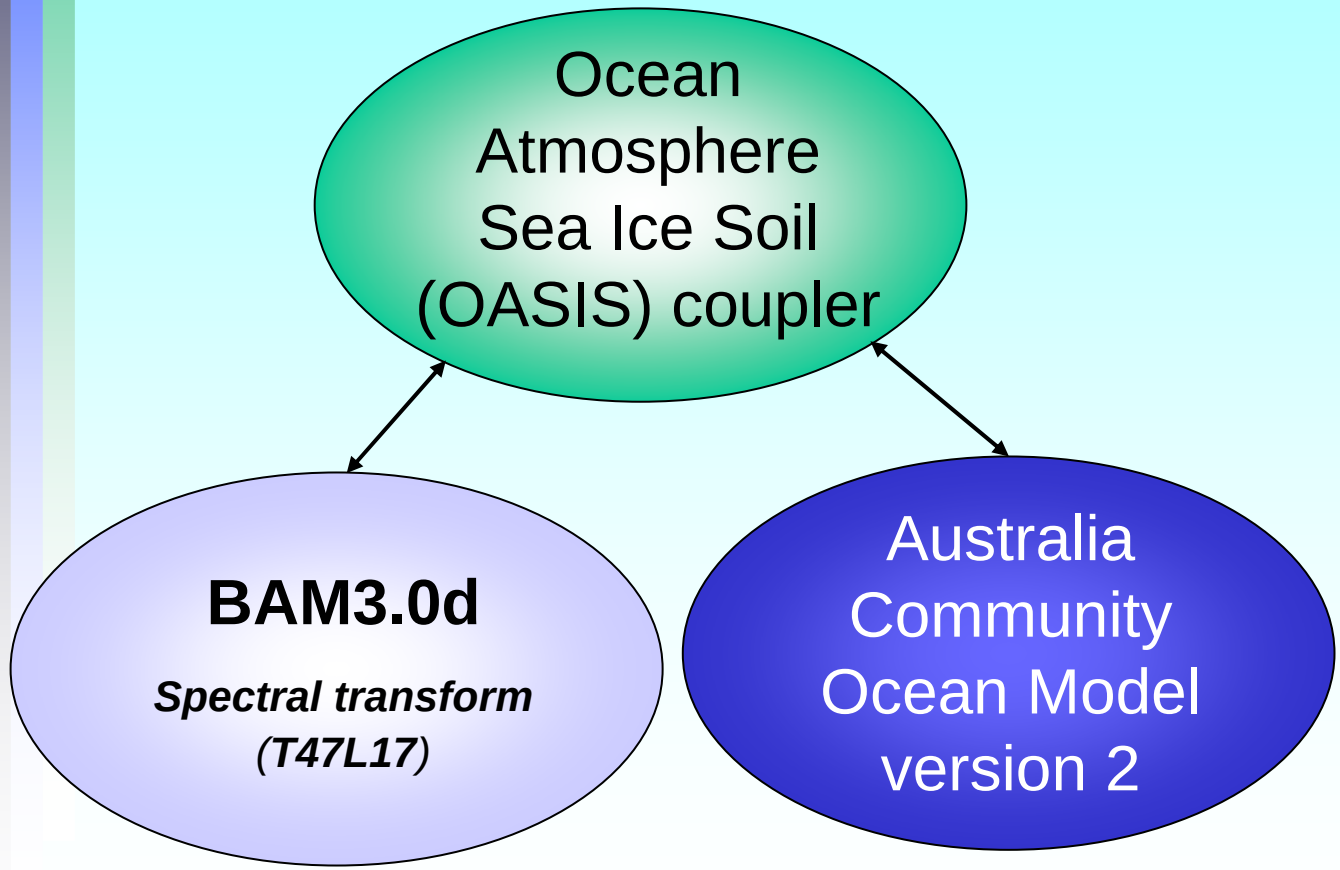
POAMA 1.5b Prediction at CAWCR

- 10-member ensemble of 9-month hindcast for the period 1980-2007

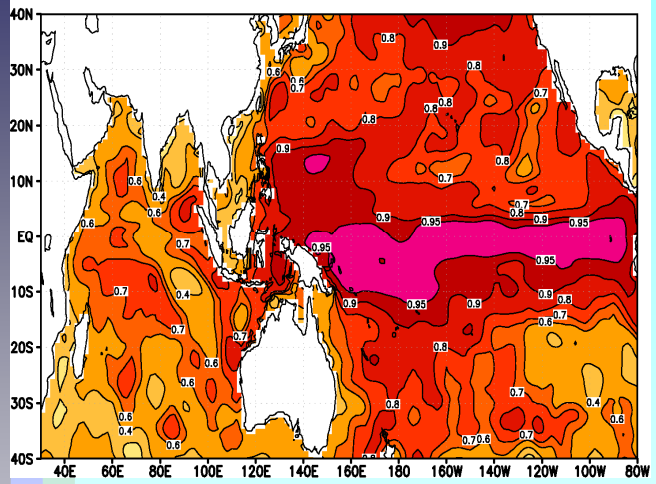


- Ocean data assimilation provided ocean ICs
- Atmosphere ICs are provided by the Atmosphere-Land Initialisation (ALI) scheme
- The ensemble was generated by only perturbing the atmospheric ICs by successively picking the analysis from a 6 hour earlier period.

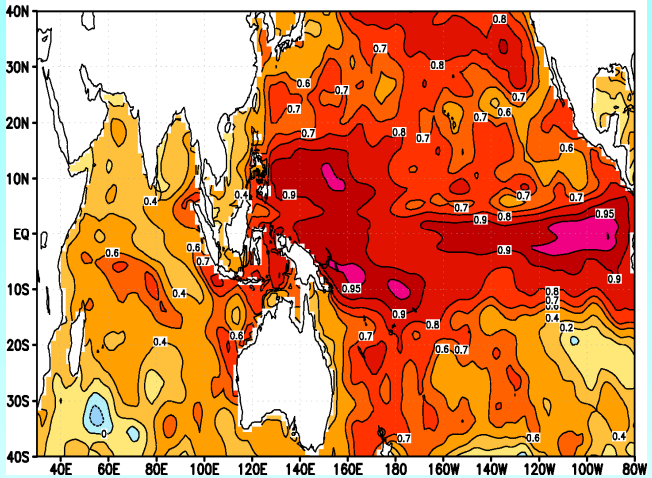
- **PEODAS** – is the POAMA Ensemble Ocean Data Assimilation System. It is best described as a coupled ensemble Kalman filter system. Ensemble-based data assimilation methods are relatively new and potentially attractive alternatives to four-dimensional variational methods for operational data assimilation systems.
- **POAMA-1** – is based on a univariate optimal interpolation (OI) system that assimilates only in situ temperature observations. This method has a significant deficiency, especially in the presence of model systematic errors. It was found that assimilation of thermal data into an ocean model near the equator often results in a dynamically unbalanced state with unrealistic deep overturning circulations. Also, salinity is not updated by POAMA-1.
- **ECMWF/ORA-S3** – Optimal Interpolation method
- **NCEP/GODAS** – 3-Dimension variational method

Temporal Correlation of T300 Anomaly

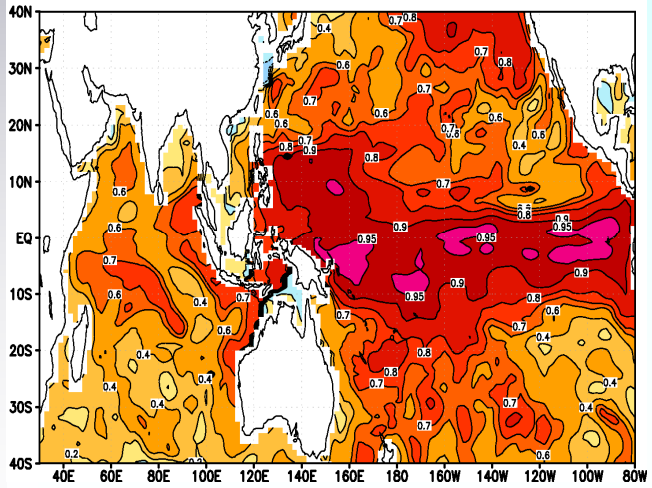
PEODAS



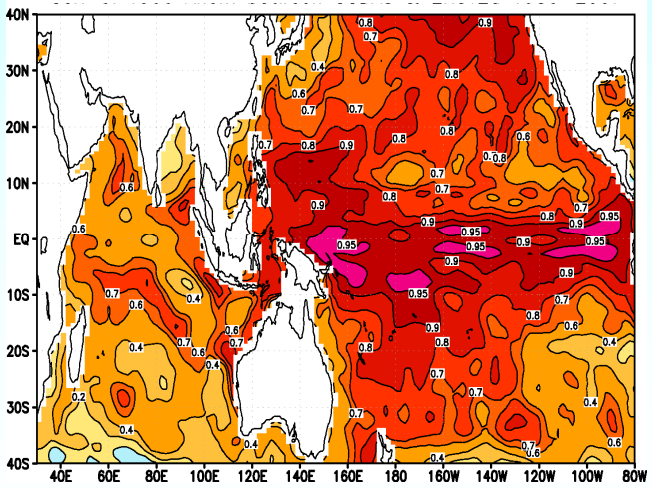
POAMA-1

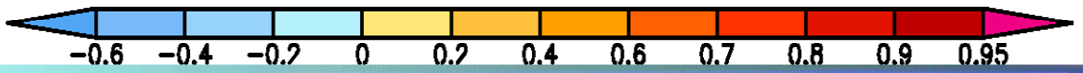


ECMWF



GODAS



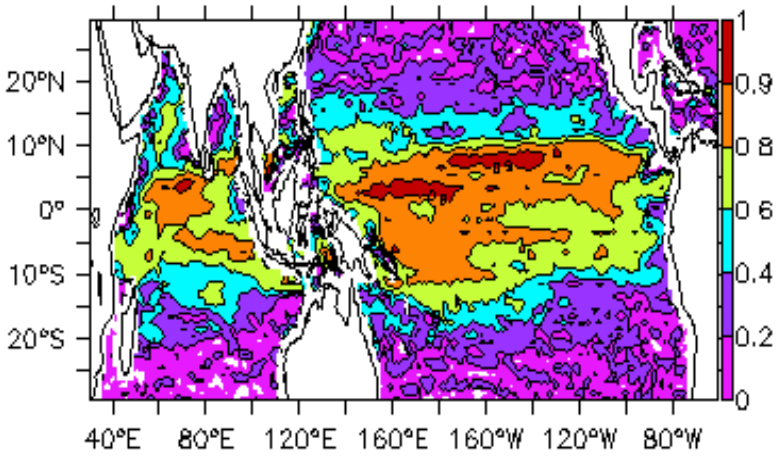


There is a big improvement along the tropical Pacific and some improvement over the eastern and western Indian Ocean.

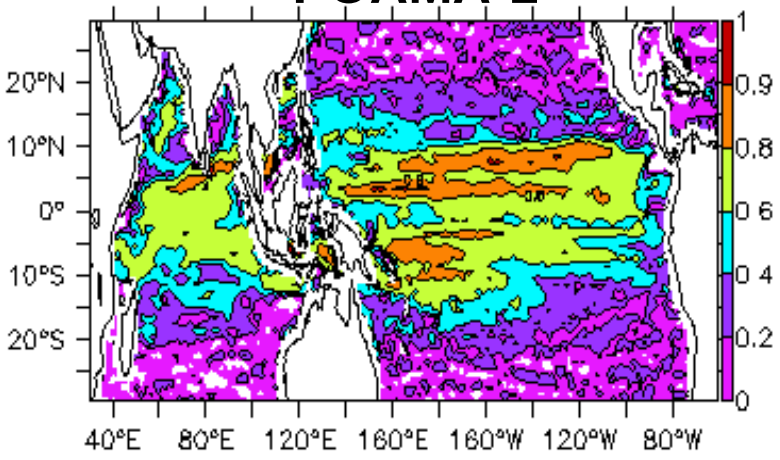
We focus largely on the tropical oceans since it is variability in these regions that is associated with the main modes of climate variability on inter-annual time scales, such as ENSO and IOD.

Correlation of zonal surface velocity

PEODAS

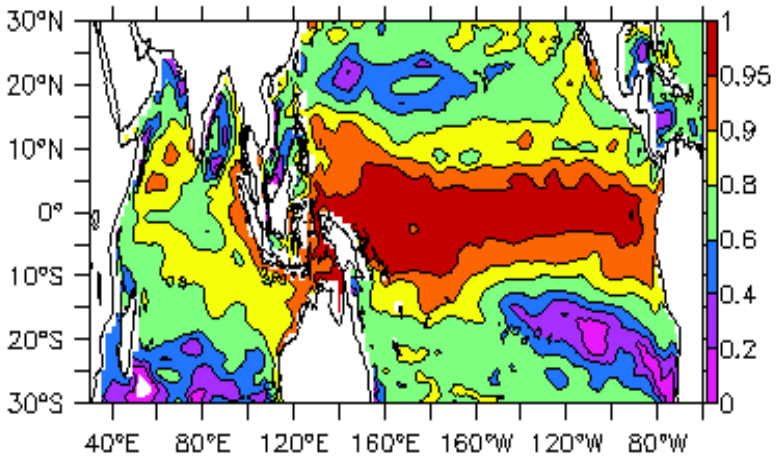


POAMA-1



Correlation of sea level anomaly

PEODAS



POAMA-1