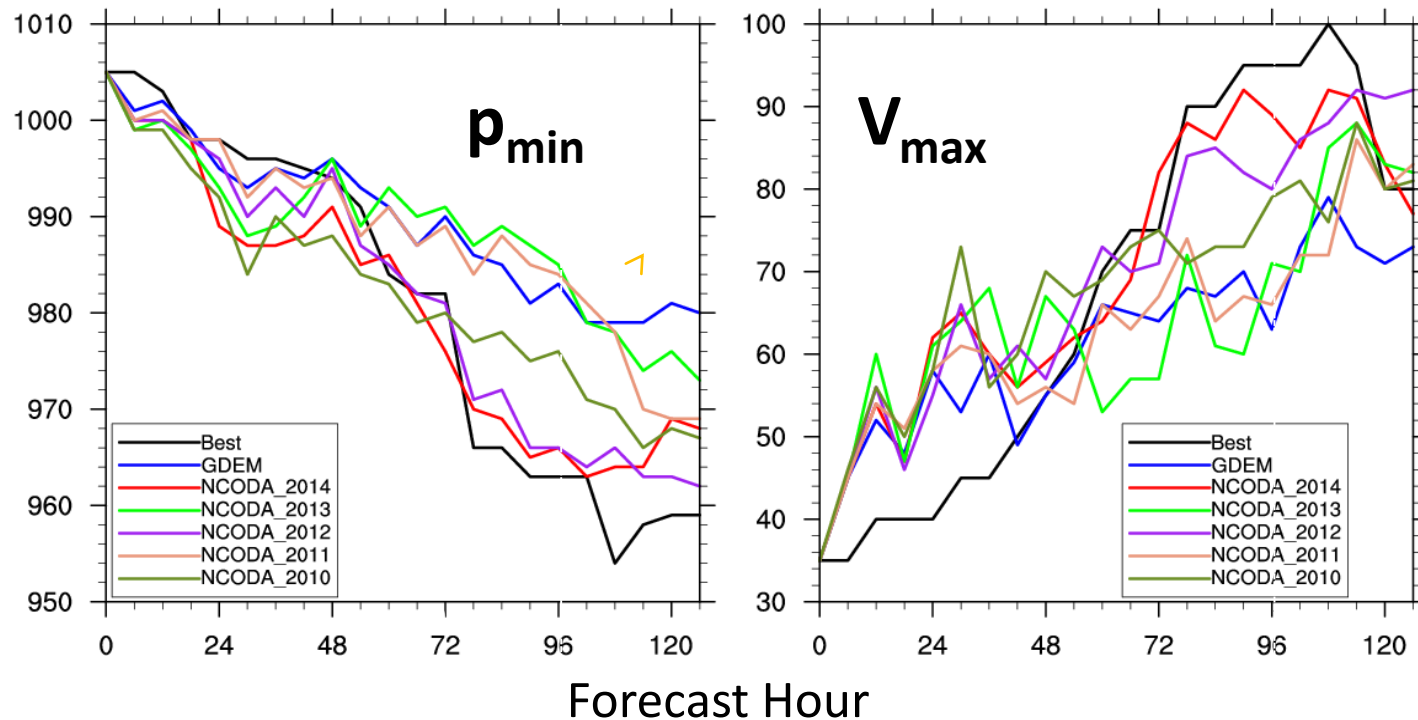# Sensitivity of Edouard (2014) intensity predictions on ocean initialization

Forecast Hour

HYCOM-HWRF initialized from GDEM climatology and Navy Global HYCOM analyses from 5 different years (2010-2014, performed by J. Dong).
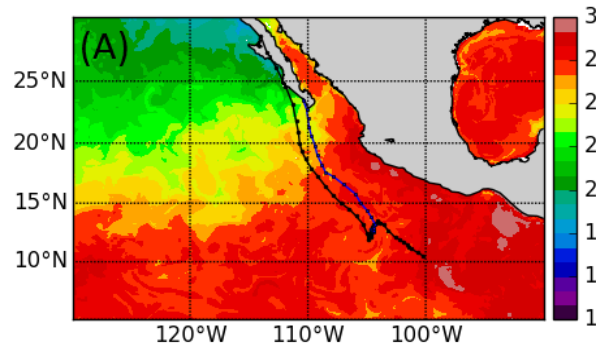
Interannual differences in upper-ocean conditions have a large influence on predicted intensity (maximum spread: 22 hPa and 30 knots).

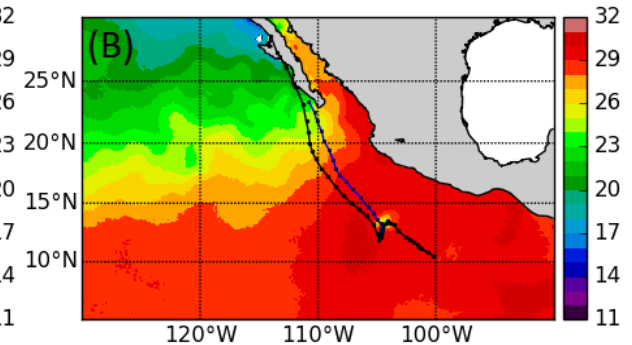Accurate ocean model initialization is necessary.

Assimilation of ocean observations is critically important for improving initialization.

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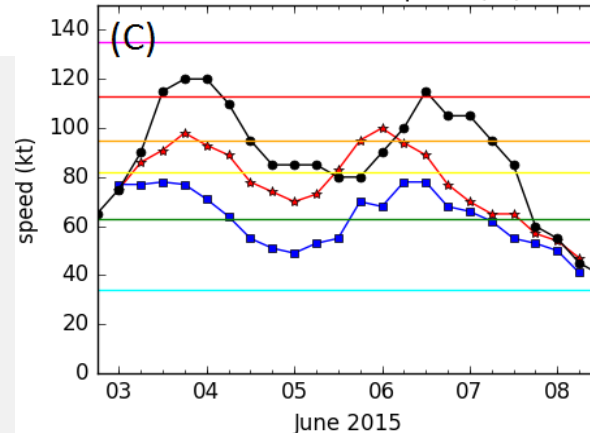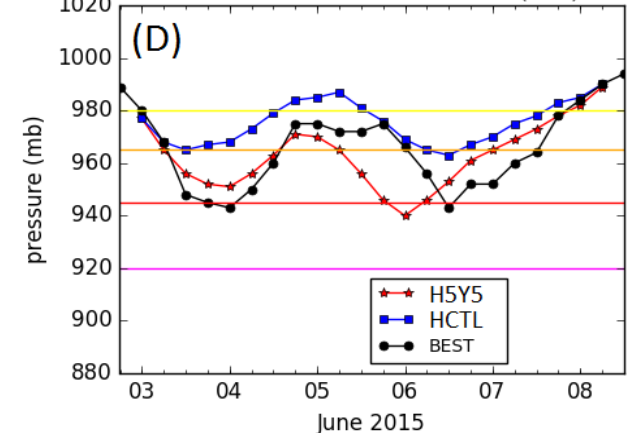# Sensitivity of Blanca (2015) intensity prediction on ocean initialization

Blanca initial SST and forecast intensity from two initializations: feature-based and RTOFS. The feature-based method only corrects SST (from H-S Kim, EMC)

POM-HWRF: feature-based

HYCOM-HWRF: RTOFS

Although two different ocean models are used, the different intensity forecasts are dominated by the different initialization procedures

Assimilation of <u>subsurface</u> ocean observations to correctly initialize heat content and 3-D eddy structure is important to improve intensity prediction.

Feature based initialization
RTOFS initialization
Best track

Ocean observation requirements

- **Although data-assimilative ocean analyses have improved over recent years, products that assimilate the existing global ocean observing system still contain significant errors and biases**

- **Improved observational coverage can substantially reduce these remaining errors and biases**
  - Seasonal enhancements to the global observing system (e.g. underwater gliders, ALAMO floats)
  - Rapid-response measurements (e.g. airborne profile surveys)

- **OSEs and OSSEs are being used to quantitatively assess observing system impacts, and to design improved observing strategies, based on error reduction in ocean analyses used to initialize forecast models**

- **The OSE/OSSE work must be extended to quantitatively assess impacts on actual coupled TC forecasts**
  - Tools exist to perform this work, but the lack of resources has limited progress

Additional resources are needed, both to design improved ocean observing strategies and to support collection of the required observations.