NOAA's operational climate monitoring and prediction products provide the public with critical information about environmental conditions for better preparedness and improved resiliency. NOAA's Modeling, Analysis, Predictions and Projections - Climate Test Bed (MAPP-CTB) projects support transition of research advances from external community to National Centers for Environmental Prediction (NCEP) to accelerate the implementation of operational climate monitoring and prediction systems, 2) testing the performance of model components and schemes of methodologies, and 3) testing a multi-model subseasonal climate prediction system via model selection, system optimization and products evaluation. By tracking progresses on twenty-three MAPP-CTB projects, this presentation highlights major achievements to date and assesses the Transition Readiness Level (TRL) by measurements of benchmarks and deliverables following NOAA Administrative Order (NAO).

**Experimental Prediction Methodologies and Products**

- **EHE intensity mortality is not correlated with EHE however as the intensity of the EHE increases there is a clear increase of abnormal mortality.**

**Multi-Model Subseasonal Climate Prediction System**

- **The ability of the CFSv2 seasonal forecasts to suppress the number of flash droughts has been evaluated.** The figure shows the frequency of occurrence (%) of sub-seasonal flash droughts from actual data and CFSv2 predictions for the period of 1982-2016 and it illustrates that the model has a tendency to underestimate the number of flash droughts, especially for the period of 1982-1990. The results suggest that improvements in future model versions are needed to better simulate flash droughts in the region.

**Progress Report:**

- **To examine the role of atmospheric circulation, two versions of initialization are compared using GFDL-FLOR model.** The results show that the model initialized with a high-resolution atmospheric circulation produces a better forecast than the model initialized with a low-resolution circulation. The study indicates the importance of using high-resolution atmospheric circulation in future climate forecasts.

**Correlation skill of week 3-4 temperature forecasts by the NCEP-CFSv2 model**

- **An experimental daily flash drought monitor system was developed.** This system is designed to improve the detection of flash droughts, which can help in the early warning and mitigation efforts.

**Progress Report:**

- **One-week lead two-way nested high-resolution temperature ensemble forecasts over North America averaged for JFM 2014.** The hindcasts are compared with NCEP-CFS control (bottom). The results show that the model is able to capture the temperature variations accurately, indicating the potential of the model for climate monitoring and prediction applications.

**Visualizing Cloud Status with the Cloud and Aerosol Product (CAP) System**

- **The green regions show improvement.** For example, the improvement is observed in the simulation of cloud properties, such as cloud fraction and cloud liquid water content. These improvements are achieved through the incorporation of advanced algorithms and methodologies.

**Algorithm Development and Verification:**

- **An algorithm was developed to objectively evaluate the distribution of cloud condensate.** The algorithm is validated against a time series of SHOC measurements to assess the model's performance. The results demonstrate that the model accurately simulates the distribution of cloud condensate, providing valuable information for climate monitoring and prediction applications.

**Correlation skill of week 3-4 temperature and precipitation of CFSv2 hindcasts over CONUS during selected years.** The hindcasts are based on a high-resolution ensemble (comprising 16 members) drawn from the high-resolution hindcasts. Values that are statistically insignificant at the 0.05 level are masked. The results indicate that the model has a high correlation skill for temperature and precipitation forecasts, providing valuable information for climate monitoring and prediction applications.

**Progress Report:**

- **Examine the impact of atmospheric circulation, two versions of initialization are compared using GFDL-FLOR model.** The results show that the model initialized with a high-resolution atmospheric circulation produces a better forecast than the model initialized with a low-resolution circulation. The study indicates the importance of using high-resolution atmospheric circulation in future climate forecasts.