

## **Diagnosis of the extreme track forecast differences associated with Hurricane Sandy (2012)**

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Approximately five days prior to landfall, global model forecasts of Hurricane Sandy suggested the TC could make landfall either along the east coast of the United States or move harmlessly out to sea. For some initialization times, the difference between five day forecast positions from various models exceeded 2500 km, which proved to be a significant challenge for forecasters and suggested a potential high sensitivity of track forecasts to the initial conditions. This study explores the role of initial condition errors in producing the large divergence in track forecasts by comparing forecasts from the experimental 80 member GFS ensemble forecast system run at ESRL that were characterized by extreme westward and eastward tracks. Preliminary results for the 0000 UTC 25 October forecast suggest that the eastward tracking members were characterized by less upper tropospheric divergence, which leads to less amplification of the midlatitude flow to the north. This less amplified flow imparts an anomalous eastward steering wind onto Sandy, such that the TC is too far east to be captured by the midlatitude trough over CONUS within the forecast. By contrast, the trough that eventually captures Sandy is weaker and further upstream in the analysis for the westward tracking members. This trough is able to dig further south in the forecast and capture Sandy earlier in the forecast.