1. Motivation
NHC official track forecast error for Ike increased substantially on 9–10 September 2008
Average error of NHC 72-h forecasts issued on 9 Sep was 38% higher than the average NHC 96-h forecast error from 8 Sep
On 8–9 September all of the track model guidance shifted toward the south and west to the left of the eventual track of Ike (white line)
Emergency managers and other users were making critical decisions in this pre-watch frame (e.g., executing bus contracts for evacuations) when the forecast error increased

Research Questions
Q1: What were the critical synoptic-scale features that influenced the track of Ike?
Q2: What were the sources of initial condition sensitivity in the numerical models?

3. Sensitivity Experiments: Design
• Test sensitivity of Ike’s track in the NCEP GFS model to the several synoptic-scale features identified by modifying the initial analysis using the NCEP GSI system
• Synthetic observations of temperature are assimilated
• New perturbed analysis produces a balanced increment local to the observation
• Integrate perturbed analysis forward using operational GFS model
• Assimilation / initial time: 00 UTC 9 Sep 2008

4. Sensitivity Experiments: Results
• Most perturbation experiments produced little change to Ike’s track, as the hurricane moved too far south into northern Mexico or extreme southern Texas
• Track forecasts in the first 24 h are almost identical due west in all cases, regardless of the later evolution
• Largest sensitivity to experiment e1, weakening the ridge A north of Ike
• Allowed Ike to gain enough latitude to eventually recurve
• Landfall at 96 h more than halfway toward the actual location compared with the operational GFS
• Experiment e4, deepening the California shortwave E, also resulted in a northward shift of the track
• Landfall location approximately halfway between operational GFS and best track

5. Concluding Remarks
• Ike’s track was sensitive to the amplitude and orientation of a mid-level ridge to its north, and an upstream shortwave trough over California
• Forecasts of tropical cyclone track remain susceptible to initial condition errors
• Initial condition errors may potentially be reduced via augmentation of the routine observational network and advances in modeling and data assimilation