GNSS Meteorology
Dean Forecast

- Control
- Cycling PWV DA

Maps showing different weather patterns: 2007-08-20_00
Temporal Evolution of Phase Change of Water

- D cloud water
- D rain water
- D water vapor
- D temperature + D wind

0 min, 16 min, 32 min, 48 min
Energy Balance in Hurricane

- Kinetic Energy: $10^{18}$ J
- Friction: $10^{13}$ J/sec
- Release of latent heat from phase change of water (water vapor to liquid water): ? J/sec

- 21:00 Jamaica station provides equivalent latent heat of $2.2 \times 10^{18}$ J from positive increment of water vapor.
- M 8.5 earthquake: $3.6 \times 10^{17}$ J
- Atomic bomb: $8.0 \times 10^{13}$ J, Hydrogen bomb: $4.0 \times 10^{16}$ J
Cold 3DVAR vs Cycling 3DVAR

• Significant improvement for track forecast in cycling 3DVAR
Track Forecast Errors

IC: 2008-09-25_00Z

- Cycling 3DVAR forecast is much better than cold 3DVAR forecast
- Forecast with COSMIC profile is better than that without COSMIC profile