1. MOTIVATION & OBJECTIVES

- Complex coastal meteorology (e.g., land-sea breeze circulations) can cause adverse effects on air quality; while radiatively active pollutants (e.g., aerosols) could feedback on meteorology and air quality.

- OBJECTIVES: By using both high-resolution modeling and observations, we will
  - analyze spatial & temporal (diurnal and day-to-day) variations of aerosols
  - examine the role of coastal meteorology
  - discuss implications for GEO-CAPE measurements

2. AEROSOL MODELING & OBSERVATIONS

MODELING
- CMAQ driven by WRF (offline, no feedbacks)
- Nested grids 36km -12km - 4km
- Modeling period: June 28 - July 4, 2007
- ramp-up: June 28-30;
- analysis: July 1 – 4
- sulfate, ammonium, nitrate, OM, BC, dust, sea-salt
- Mass to AOD (500nm) conversion: following GOCART

Focused Area (4km res. Domain)

3. AEROSOL ACCUMULATION: MODELING & OBSERVATIONS

AERONET Measurements
- AOD at 500 nm
- Available sites: Table Mountain, La Jolla

GOES Operational Aerosol Retrieval
- Geostationary – GOES-West
- AOD at 550nm: 4 km, every 30 min
- Data screening: scattering angle, clear-pixels, surface reflectivity, AOD std deviation, and signal strength

4. ROLE OF COASTAL METEOROLOGY

Aerosol accumulation results mainly from recirculation (occurrence of return flow of sea breeze on July 3 & 4, due to weaker background wind).

5. AEROSOL AUTO-CORRELATIONS

Large spatial and temporal variations of aerosol in coastal area can be adequately (auto-correlation $R > 0.9$) captured by geostationary satellite observations with time resolution of 1-2 hrs and spatial resolution of 4-7 km.