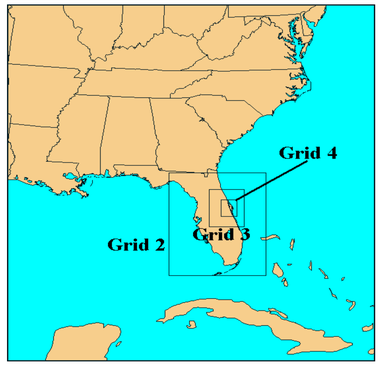
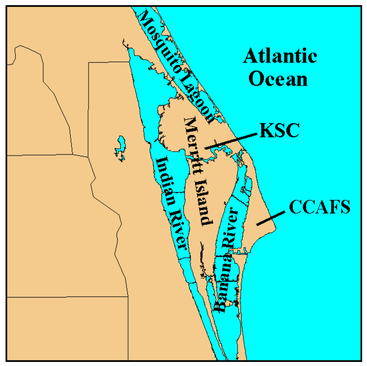
VERIFICATION OF RAMS FORECAST SEA BREEZES AND THUNDERSTORM INITIATION OVER EAST-CENTRAL FLORIDA

Jonathan L. Case*, John Manobianco, and Allan V. Dianic (NASA Kennedy Space Center / Applied Meteorology Unit / ENSCO, Inc.)
Dewey E. Harms (45th Weather Squadron, United States Air Force, Patrick AFB, FL)
Paul N. Rosati (45th Space Wing, Eastern Range Safety, United States Air Force, Patrick AFB, FL)

RAMS Configuration



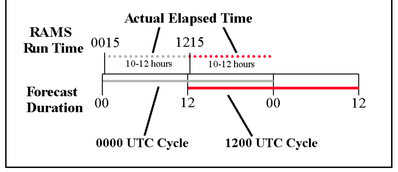
Local Geography



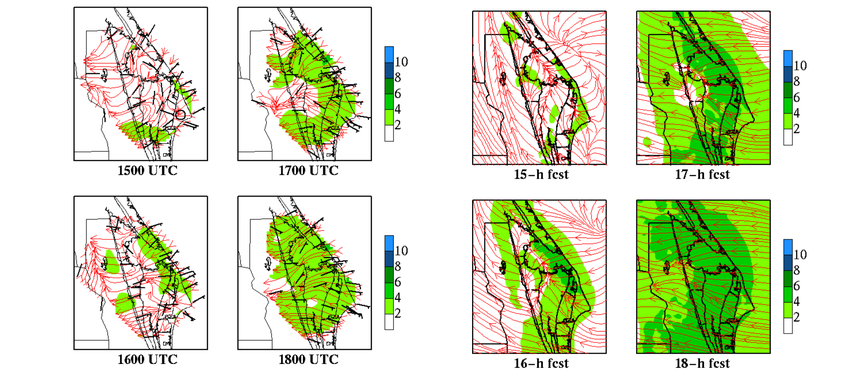
RAMS Grid Parameters

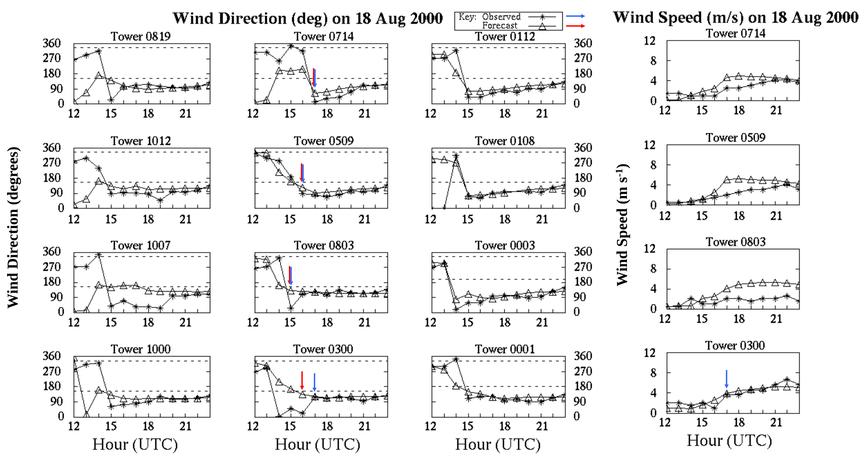
Grid	nx	ny	nz	dx (km)	dz (m)
1	36	40	33	60	50
2	38	46	33	15	50
3	41	50	36	5	25
4	74	90	36	1.25	25

RAMS Daily Forecast Cycle

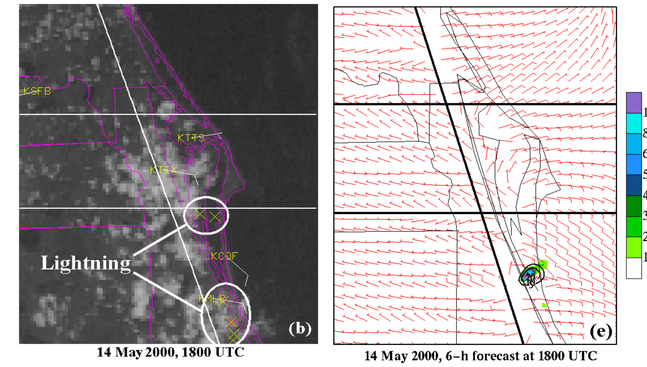


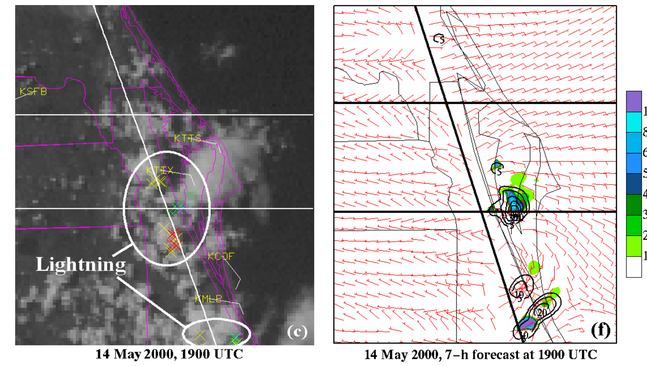
18 August 2000 Sea Breeze Example





14 May 2000 Thunderstorm Example





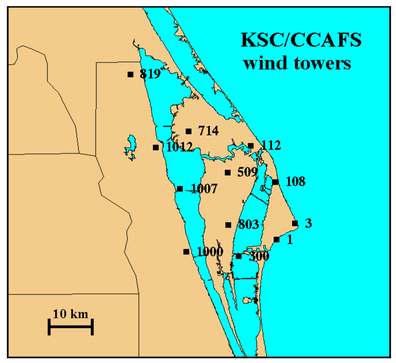
Methodology

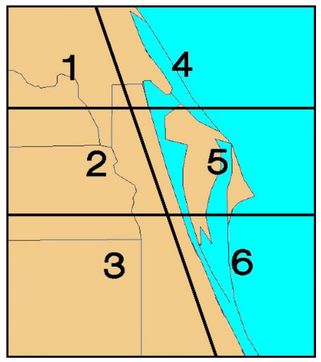
Sea-Breeze Evaluation

- **May–Aug 1999 and May–Sep 2000.**
- **Choose 12 KSC/CCAFS wind towers.**
- **Identify observed sea-breezes at towers.**
  - GOES-8 / WSR-74C data.
  - Wind shift to onshore at each tower. (335–155° orientation of coastline)
  - E-flow → Increase in negative u-wind.
  - Evaluate SB occurrence at each tower.
- **Identify forecast sea-breezes using same criteria.**
- **Construct contingency tables.**
- **For all "hits", calculate timing errors.**

T-storm Initiation Evaluation

- **May–Sep 2000.**
- **Divide RAMS 1.25-km grid into 6 zones.**
- **Identify observed t-storms in each zone.**
  - Local lightning surveillance system.
  - First CG lightning strike to nearest hour.
  - Daytime hours of 1500–2300 UTC.
- **Identify forecast t-storms in each zone.**
  - Forecast w at 7 km > 2 m s^{-1} (convective). (Following Yuter & Houze 1995a,b results)
  - Forecast rainfall rate > 5 mm h^{-1}.
  - 00 / 12 UTC forecasts for 1500–2300 UTC.
- **Construct contingency tables.**





Sea-breeze Occurrence Statistics (May–Aug 1999 and May–Sep 2000)

Sea-Breeze Occurrence: Forecast vs. Observed

0000 UTC Cycle	Observed Sea Breeze	No Observed Sea Breeze
Forecast	1381	261
No Forecast	228	599
1200 UTC Cycle	**Observed Sea Breeze**	**No Observed Sea Breeze**
Forecast	1575	1575
No Forecast	293	293

Categorical and Skill Scores

Parameter	0000 UTC Cycle	1200 UTC Cycle
Probability of Detection	0.86	0.98
False Alarm Rate	0.16	0.16
Bias	1.02	1.16
Critical Success Index	0.74	0.83
Heidke Skill Score	0.56	0.69

Thunderstorm Initiation Statistics (May–Sep 2000)