OBSERVATIONS & MODEL

Regional adaptation of the Princeton Ocean Model with 2-6km horizontal resolution and 21 o-layers.

Spring and fall seasonal transitions (top) coincide with changes in sign of the net surface heat flux (bottom). Stratification occurs during spring and early summer, destratification occurs during fall and winter. Inter-annual variability is also observed.

RESULTS

NCEP climatology annual cycle of SST (left) and SLP (right).

Spring & Summer

Temperatures in spring show synoptic-scale stratification events, due in part to decreased wind stress and increased surface heat flux.

Fall

Fall temperatures show a series of sudden step-like decreases. These are due to tropical storms (e.g. Sept. 17th), extra-tropical systems (e.g. Oct. 10th), and associated ocean circulation responses. The largest momentum flux is associated with hurricanes, but the largest surface heat flux is due to extra-tropical fronts.

REFERENCES


CONCLUSIONS

1. GOM SST gradients, affecting surrounding land mass climate, results from differences between deep and coastal ocean temperatures, and vary seasonally and inter-annually.

2. WFS seasonal transitions coincide with net surface heat flux changes (warming to cooling in fall, and conversely in spring).

3. Inter-annual variability is observed on the WFS.

4. Seasonal and inter-annual SST changes are largely surface heat flux controlled.

5. Synoptic scale variability is due to both ocean circulation and surface heat flux, and the thermodynamics are 3-D.

6. Tropical storms provide the largest momentum flux, but extra-tropical systems may provide larger net heat flux.

7. The necessity for including adequate net surface heat flux in coastal ocean models will challenge evolving coastal ocean observing systems.