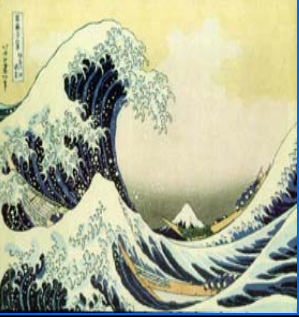


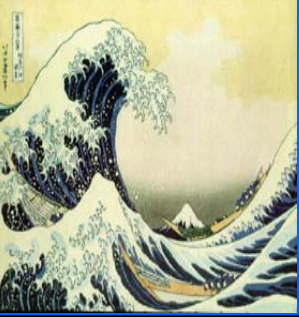
Identify existing modeling approaches

- Key physical processes
 - Shear-induced mixing
 - Advection (in some cases)
 - Downward momentum stress
 - Turbulent kinetic energy from wave breaking
 - Current-wave interaction especially in presence of eddies
 - Bottom boundary layer on the shelf
 - Non-local vertical transport
- Is 1-D current model adequate?
 - May be adequate in some cases
 - In other cases may be inadequate
 - » Slow moving storms (upwelling)
 - » oceanic mesoscale features
 - » In water depths less than $O(100 \text{ m})$



Ocean Current Modeling Requirements

- Vertical resolution for current models
 - Upper 100 m & near-seabed ~ 5 m
 - Less in mid-water column
- Horizontal resolution for current models
 - Probably 1-5 km
 - May be needed provide proper feed-back to storm intensity
 - Needed to resolve Loop/eddy structure
- Initial conditions: need 3-D TS structure
 - Can use altimeters but limited by
 - » No subsurface
 - » Won't resolve mesoscale features well
 - Best solution is to use data-assimilating operational 3-D current model
 - Need operational aircraft that can drop expendable probes in front of hurricane
 - Utilize IOOS as it becomes available
 - Develop data assimilation methods to integrate data into model



Ocean Wave Modeling Requirements

- High wind physics need further work
- Spatial resolution similar to ocean model
- Must include shallow water effects on the shelf
- Operational current models don't presently include effect of waves on currents
- Need to couple ocean circulation/wave model with coastal surge/wave model