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FEATURE-ORIENTED REGIONAL MODELING AND SIMULATIONS (FORMS) FOR THE WESTERN SOUTH ATLANTIC, SOUTHEASTERN BRAZIL REGION

The multi-scale synoptic circulation system in the southeastern Brazil (SEBRA) region is presented using a feature-oriented approach. Prevalent synoptic circulation structures, or "features", are identified from previous observational studies. These features include the southward flowing Brazil Current (BC), the eddies off Cape Sao Tome (CST) and off Cabo Frio (CF), and the upwelling region off of CST. Their synoptic water-mass (T-S) structures are characterized and parameterized to develop temperature-salinity feature models. Following the Gangopadhyay et al. (2003) methodology, a synoptic initialization scheme for feature-oriented regional modeling and simulation (FORMS) of the circulation in this region is then developed. First, the temperature and salinity feature-model profiles are placed on a regional circulation template and then objectively analyzed with available background climatology in the deep region. These initialization fields are then used for dynamical simulations via the Princeton Ocean Model (POM). A combination of different feature models and climatology fields were then used to dynamically understand the relative importance of baroclinic and barotropic instability mechanism for the growth of the BC meandering. Our future plan includes the application of these feature models with satellite, in-situ data and advanced data-assimilation schemes.