Observations for climate: Satellite observations for climate studies

David Lindo[†]; Gustavo Goni; Francis Bringas; Barbara Muhling; John Lamkin [†] UM/CIMAS, NOAA/AOML, USA Leading author: <u>Gustavo.Goni@noaa.gov</u>

Spatial and temporal distributions of larval fishes have been related to environmental conditions and mesoscale oceanographic structures, with subsequent effects on larvae growth and survival and, thus, recruitment to adult populations. Using satellite altimetry and in situ larval fish densities a methodology was developed to investigate the link between ocean variability and larval distributions of six fish taxa in the Gulf of Mexico (GOM), during the spring months from 1993 to 2007. Results indicate that the northward penetration of the Loop Current (LC) tended to increase during spring and reach maximum values in summer. Frontal positions, northward excursions of the LC, and other mesoscale features in the GOM were important for determining larval distributions, with generally higher larval abundances during years of high northward penetration. Our results showed that larvae of bluefin tuna (Thunnus thynnus), little tunny (Euthynnus alleteratus), Auxis spp., and snappers (Lutjanidae) were preferentially located within the boundaries of anticyclonic features (generally between 140-150 cm of sea surface height), and within GOM common waters. Our findings suggest that the position and strength of mesoscale features in the GOM is likely to dictate the temporal and spatial distribution of larval fish assemblages, possibly by influencing the area and persistence of habitat favorable for adult spawning. These results are important because they highlight the relationship between the upper ocean dynamical and thermal conditions and larval recruitment. Any long-term variability of these conditions will be probably linked to changes in recruitment. In the Gulf of Mexico, a long term variability of the upper ocean conditions has been observed for both sea surface temperature and sea height. Results presented here also stress the need for a sustained observing system able to resolve mesoscale features, which are important for the upper ocean temperature response to the changing climate, and continuous sampling of larvae of economically important species.