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Surface circulation of the Caribbean Sea and Gulf of Mexico using 13 years of satellite altimetry data

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The surface circulation of the Caribbean Sea and Gulf of Mexico is studied using thirteen years of satellite altimetry data. In the Caribbean Sea, processes at several temporal scales are analyzed: the Caribbean eddies and meanders characteristics, the annual cycle and its variability through time, and the interannual variability, with a cycle of about 4 years affecting the SSH slope across the current and hence the intensity of the Caribbean Current. Our analyses suggest that this cycle is related to changes in the wind intensity, wind curl and El Niño Southern Oscillation.

In the Gulf of Mexico, the variability of the Loop Current is studied. We analyze the timing of anticyclonic eddy detachment from the Loop Current, the relation between the size of these eddies and the period between detachments, and the intrusion of the Loop Current into the Gulf of Mexico. A series of extreme Loop Current intrusions into the Gulf of Mexico, when the current is observed as far as 92°W, are described. The frequency of such events appears to have increased in recent years, with only one event happening from 1992 to 2002 (in 1993) versus three from 2002 to 2006.