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Mesoscale in the coastal zone of the Southern Baja California Peninsula, through color images

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From an oceanographic point of view the southern half of the Baja California peninsula is a region of great interest due to the convergence of water masses from different origins. The California Current brings to this area water of subarctic origin than merge with those that originate inside the Gulf of California and also, from further south, in the tropical Mexican Pacific. This creates an intense mesoscale field, clearly seen in the satellite imagery populated with many features such as ocean fronts and eddies. South of Cabo San Lucas fronts are formed in the upper 100 m due to the presence of waters from the California Current and the Gulf of California. Fronts here are reported mostly during spring and summer. In order to identify the presence and permanence of ocean fronts and eddies, and to identify the seasonality of such structures in the coastal zone of Southern Baja California, we processed daily high-resolution color images for the last ten years (2002 to 2011). The source of the data is the MODIS-AQUA project and we used level 2 data, which corresponds to 1 km spatial resolution. We chose these because they are the more appropriated for studies of the 50-km coastal band due to its high resolution. The level 2 data however, are not projected onto a Cartesian coordinate system, i.e. the pixel information, although correctly geo-referenced, is not mapped onto a regular grid and it does not always cover the same area. We applied an optimal interpolation algorithm to project the information onto a regular 1-km grid of the 50-km coastal zone around the southern half of the Baja California Peninsula. We processed thus some 3000 images of chlorophyll a. From this we present a discussion of the main frontal structures and semi-permanent mesoscale eddies, its seasonality and possible origin.