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Ekman transport analysis along the Galician Coast (NW Spain) using wind data from the MM5 numerical model

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Ekman transport has been widely treated in the literature since Ekman seminar paper. Although the Ekman approach is simple, elegant, and clearly supported by laminar laboratory experiments, the Ekman model is, however, rather dissimilar to the actual turbulent flow near the ocean or lake surface. Ekman transport remains still valid to provide a macroscopical description of water transport near surface. Ekman transport can result in: Driving surface waters apart (divergence) creating zones of upwelling; forcing them together (convergence) creating zones of downwelling; driving surface waters away from coasts (upwelling); and pilling them up onto coasts (downwelling). Upwelling events have been largely studied along eastern boundary coastal systems all over the world. This phenomenon is commonly attributed to the actions of the wind along a coast, which generates an Ekman drift directed either onshore or offshore, to which the coast stands as an obstacle. The Galician western coast is part of the so called NW Iberian Upwelling System. In fact, this system is the northernmost limit of the Eastern North Atlantic Upwelling System, which extends from 10 to about 44ž N. Seasonal patterns along the Galician coast were calculated by averaging the hourly values provided by the MM5 model (http://www.meteogalicia.es) at each grid point. Two different seasons were calculated every year: the dry season, corresponding to May- September, and the wet season corresponding to November- March. In spite of the existence of important interannual fluctuations, especially during the wet season, the seasonal Ekman transport is characterized by the following facts. During the wet season, transport amplitude decreases from north to south, and the transport direction depends on coast orientation. During the dry season transport amplitude is much

higher at the western coast than along the rest of the coast. In fact, transport decreases considerably at the middle coast and is almost negligible at northern coast.