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Eddy diffusivity in the ocean surface

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In order to measure eddy diffusivity in the ocean using a scaling that includes the thickness of the surf zone as well as the depth and the wave period[1,2]. Measurements in the Mediterranean are almost two orders of magnitude smaller than in the Pacific coast. On a larger scale, and further away from the coast the relevant eddy di[U+FB00]usivities are much larger, because large eddies often scale on the Rossby deformation radius, LR. Direct measurements of the diffusion and the horizontal velocity [U+FB01]eld were performed at several sites in the coastal areas of Spain. The diffusion coeficients were calculated
by evaluation from video images of the area of milk and [U+FB02]uoresceine blobs released at different positions and with different wave heights, wind speeds and tidal induced currents[1-3].

There are instances with either low hipo-di[U+FB00]usivity or high hyper-di[U+FB00]usivity and local measurements in both cases indicate that spectra deviate strongly from an equilibrium spectrum. A generalized Richardson law [3,4] deduced from Kinematic Simulation (KS) numerical models may be applied also to coastal di[U+FB00]usion[5]. The eddy viscosity values show a complex behaviour that depends on wind friction, wave induced Reynolds number and flow topology. The results of more than 100 experiments show that there is a dependence of the maximum di[U+FB00]usivity on a Reynolds number derived from the wave height[1]. The increase of di[U+FB00]usivity with wave height only occurs for large enough wave Reynolds numbers. Other important factors are wind speed and tidal currents. The horizontal di[U+FB00]usivity shows also a marked anisotropy and spectral dependence [4,6].

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