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Non-linear internal waves generated at Nazaré canyon: observations over the W Portuguese inner shelf

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In situ observations of non-linear internal waves (NIW) propagating near Nazaré submarine canyon head (39 45'N / 009 15'W) and evidence of their impact over local sediment dynamics are presented and discussed in this work. Previous studies based on synthetic aperture radar (SAR) images showed strong NIW activity over the Western Portuguese shelf during the summer. These studies suggest a shelf-break generation of NIW packets that propagate shoreward and arrive to the inner shelf as dissipated thermocline perturbations. The analysis of recent SAR images from Nazaré region, show the generation of NIW at the submarine canyon rim (very close to the shore) and their propagation over the inner shelf with possible bottom cover impact. To study this activity, as well as its impact in the local sediment dynamics, a program of observations was conducted in this area during the 2004 summer upwelling season. Two moorings with termistores chains/currentmeters and a bottom lander equipped with up-looking/down-looking ADCP's and turbidity sensors were deployed at preselected locations. A simultaneous ASAR ENVISAT image was obtained during the observation, as well as CTD/nephelometry profiles and bottom sediment samples. The results reveal the propagation of strong internal waves with high bottom boundary layer velocities and highly correlated re-suspend sediment blooms. The collected data allowed a detail characterization of these processes. This work is a contribution to the European project EUROSTRATAFORM, whose objectives include the study of the specific canyon systems dynamics and related sedimentary impacts on the European continental margin.