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VM-ADCP backscatter data management using QGIS

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VM-ADCP (Vessel Mounted Acoustic Doppler Current Profiler) are regularly operating on board of several research vessels with the aim of providing 3-D ocean currents fields. Along with ocean currents, these instruments also measure acoustic backscatter profile on a known frequency, that can be of great advantages for other environmental investigations such as the zooplankton migrations. The presence of zooplankton can be detected by a variation of acoustic backscatter changing with the depth at a periodic (diurnal or semidiurnal) variability, related to the vertical migration of these organisms. GIS has proven to be a powerful tool to manage the huge amount of VM-ADCP backscatter data obtained during the oceanographic campaigns. Moreover, this allows to extract relevant information on zooplankton distribution and abundance, even when the monitoring strategy of the experiment does not completely meet the temporal and spatial resolution required for these studies. The application here described has been developed on QGIS and tested on the Ligurian Sea (Mediterranean Sea). In order to obtain the comparability of data from instruments operating at different frequencies and sampling set-up, echo intensity data are converted into volume backscatter strength and corrected for the slant-range. Using high-resolution bathymetry rasters acquired and processed by the Italian Hydrographic Institute, allows to discard the anomalous high backscatter values due to presence of the bottom. Another advantage of the GIS is the possibility to easily identify night-collected data from the daily ones and their spatial distribution, as well as those from the surface and the deeper layer. All the possible combinations can be then visualised and analysed.