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Spatial and temporal variability of R_1 in the Bay of Koper (Gulf of Trieste)

R. Soczka Mandac and B. Bogunović
Harpha sea, d.o.o. Koper, Cevljarska ulica 8, 6000 Koper Slovenia (rok@harphasea.si)

The space and time distribution of the internal Rossby radius of deformation (R_1) is explored for the Bay of Koper (Bay). The main objective of this study is evaluation of the seasonal thermohaline variation in the Bay on meso-scale processes. While currents along the southern coastline of the Gulf of Trieste are known [1]; the shape of density isolines in the vertical plane of a coastal belt of fresher water in the Bay are not known.

The calculation of R_1 follows the method of vertical modes (the eigenvalue problem), calculated from vertical profiles of buoyancy frequency. R_1 was obtained from numerous field measurements of temperature and salinity (CTD) in 2011. CTD casts were collected forth nightly on a regular 35 sampling points in May and December 2011. Obtained data were processed and spatial interpolated with an Objective Analysis method.

Space distribution of R_1, calculated from the first vertical mode of seasonal temperature and salinity, reveals that during seasons with a stratified sea (spring-autumn) R_1 increases in an offshore direction. The largest R_1 (15 km) was observed in the port basin at the beginning of June and the smallest R_1 (1 km) in the southern part of the Bay. During early autumn the maximum R_1 (8 km) was observed in the offshore direction (west), while minimum R_1 (1 km) near the southern coastline of the Bay. In the winter season, the maximum R_1(6 km) was noticed again in offshore direction, while the minimum value (500 m) was in the southern part of the Bay. This seems surprising, since the lowest values are attributed to regions of the highest stratification Badaševica river. However, in linear vertical stratification R_1 is proportional to the product of buoyancy frequency and the depth distribution drastically varies in relation to the fresh water inflow (Badaševica river) while in the winter season the R_1 distribution pattern is related to the bathymetric shape of the bay [2]. Similar distributions of R_1 were found in the Baltic Sea and the Bay of Finland [3].

References:
1. Bogunović B. and Malačič V., 2008. Circulation in the Gulf of Trieste: Measurements and model results. Nuovo Cimento (C), 31, C3, 301-326.
2. Fennel W., Seifert T. and Kayser B., 1991. Rossby radii and phase speeds in the Baltic Sea. Cont. Shelf Res., 11: 23-36.
3. Pekka A., Nekrasov A. and Myberg K., 2003. Variability of the baroclinic Rossby radius in the Gulf of Finland. Cont. Shelf Res., 23: 563-573.