# HIGH AND LOW FREQUENCY COMPONENTS OF CURRENT IN WESTERN MEDITERRANEAN SEA FROM ACOUSTIC DOPPLER CURRENT PROFILER (ADCP) AND HYDROGRAPHIC DATA

Elisa G. GORRIZ[1] and Julio CANDELA[2]

[1] Institut de Ciències del Mar, Barcelon, Spain
[2] Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, USA

In the Western Mediterranean, where mean currents are usually weak, important high frequency velocity fluctuations, corresponding mainly to inertial oscillations, have been recorded with eulerian currentmeters in surface and intermediate waters. This poses a major problem in mesoscale dynamics studies from ship underway current measurements, since spatial and temporal variability are mixed.

A filtering method (CANDELA *et al.*, 1992) has been applied to separate high and low frequency observations of currents recorded with a vessel mounted Acoustic Doppler Current Profiler (ADCP) in several cruises in the Catalan and Alboran seas during Spring-Autumn 1992. Such filtering regards the current data as function of time and location, integrating also hydrographic data to consider the vertical and horizontal effect of thermohaline fronts in the coherence of near-inertial motion. The low frequency currents obtained with this method are compared with geostrophic velocities from CTD, discussing the ranges of error affecting data from different sources.

In the Alboran Sea, where the dynamics is greatly determined by the exchange of Atlantic and Mediterranean water through the Strait of Gibraltar, the currents of low frequency show the western Alboran gyre, also detected with geostrophic studies and satellite images (SHIRASAGO *et al.*, 1994). Tidal currents play a significant role in the area (CANDELA and LOZANO, 1994). They have been separated by the filtering method, accordingly to main tidal frequencies. A discussion on mesoscale structures observed from the separated frequency components is made.

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# EVAPORATION PROBLEM AND LONG TERM VARIABILITY IN THE COASTAL AREA

Branka GRBEC and Gordana BEG PAKLAR
Institute of Oceanography and Fisheries, Split, Croatia

Evaporation is a physical process that takes place at the boundary surface between water and the air above it. Evaporation heigh is usually given in the form :

$$h_e = f_1(p) \, x \, f_2(T) \, x \, f_3 \, x \, (e_s - e_w)$$

where each term represents the effect of one of the meteorological elements (p the pressure, T the absolute temperature, u the wind speed); $e_s$ is the maximum vapour pressure corresponding to temperature and salinity of water, ea is the vapour pressure in the air. Different expressions have been chosen for the functions $f_1$, $f_2$ and $f_3$ and a formula of this type results in the well know formulas for empirical evaporations (JAKOBS, 1958; LAEVASTU, 1965; GILL, 1982) showing the dependence of prevailing weather conditions.

Data used for this work were collected from meteorological stations at three location along Adriatic coast (Trieste, northern Adriatic; Split midlle Adriatic and Dubrovnik, southern Adriatic). Based on the mean monthly values, evaporation was calculated first for the station Trieste for the period 1961 - 1970 using three different bulk aerodynamic formulas (JAKOBS, 1958; LAEVASTU, 1965; GILL, 1982). As $e_w$ and $e_a$ are not linear function of the meteorological parameters, a difference of more than 15% between the results obtained averaging daily evaporation data and ones obtained computing ew and ea by direct used of monthly mean data are evident (PICCO, 1991). Besides using the same data set different empirical constant K appear in formula for evaporations (PICCO, 1991; STRAVISI and CRISCIANI, 1986; SUPIC, 1993). Values found from preceding formula were also different from evaporation obtained by thermal equlibrium equations (ZORE-ARMANDA, 1968). Figure 1 show results of three different formula.

The influence of each meteo-oceanographic parameters in each formula was checked and results were compared with the evaporation data over land (station Trieste). Finaly, the most suitable formula was chosen and used to calculate long-term fluctuations and linear trend along the Adriatic coast.

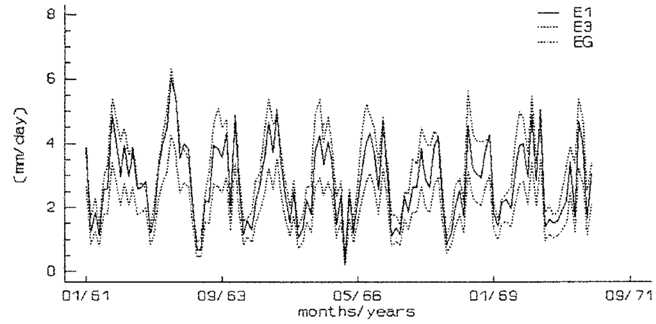


Figure 1. Mean monthly evaporations (mm/day) calculated using three different formula for station Trieste, period 1961-1970. Time series denoted as E1 is calculated using Jacobs formula, E3 using Laevastu and EG using Gills formula.

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