



0.1 Extreme Sea Levels in the Southern Aegean Sea from a Tide Gauge Record and a Surge Model

A. Papadopoulos (1), S. Mertikas (1), and M.N. Tsimplis (2)

(1)Mineral Resources Engineering Department, Technical University of Crete, Chania, Greece,

(2) James Rennell Division for Ocean Circulation and Climate, Southampton Oceanography Centre, Empress Dock, Southampton, Hants, SO14 3ZH, United Kingdom.

(tpapadop@mred.tuc.gr / Phone: +30 2821037633)

Extreme levels in the Southern Aegean Sea (Eastern Mediterranean Sea) were studied using a tide gauge record and a barotropic surge model. The influence of mean sea level and seasonal changes in the observed extremes has also been investigated. Two time series were constructed to describe the surge component of sea level by adjusting the tide gauge record for tidal and seasonal effects. In the first of these two surge series the average seasonal cycle was subtracted from the tide gauge record, while in the other the seasonal effects were represented by the seasonal cycle estimated from each year of sea level data. The interannual variability of the higher annual percentile series is of the order of decimeters even when variations of the mean sea level are taken into account. Significant positive trends in the series adjusted for mean sea level variations have been found only in the 99.9th annual percentiles of the tide gauge record and in the annual maxima of one of the two surge series. The higher percentile series are strongly correlated with the winter NAO index after 1992. This correlation seems to be related with seasonal variability as it disappears when the seasonal cycle of each year is subtracted from the dataset. The higher percentiles of obtained form the surge model series do not exhibit significant trends. Similarly no correlation between the higher percentile series obtained from the surge model and the NAO index was found. The 100 year return levels obtained from the tide gauge record and the two surge series constructed from it are consistent with each other. The surge model persistently underestimates the magnitude of the extreme events, and the return levels inferred from it are several centimeters lower than the ones obtained from the sea level record.