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Cyclones leading to positive and negative sea level extremes in the Mediterranean Sea

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This study describes the strong link between cyclones crossing the Mediterranean region and sea level extremes, which are mainly caused by a pressure-induced redistribution of water within the basin, though wind plays a substantial role in shallow water areas (mainly in the Gulf of Gabes and North Adriatic Sea). Cyclones produce positive and negative anomalies in different parts of the basin, depending on their positions and tracks. For example, cyclones entering from the Atlantic Ocean domain produce initially positive sea level anomalies and successively, as they continue moving along the Mediterranean branch of the storm track, negative anomalies at several coastal stations in the western Mediterranean. Cyclones generated in the Western Mediterranean cause positive sea level anomalies along most of the basin coastline, but negative anomalies along the northwestern coast. The link between cyclone position and sea level anomaly is evident for both positive and negative events, but the dependence of the magnitude of the anomaly on the value of the low-pressure minimum is much stronger for the former than for the latter.