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Processing multi temporal Thematic Mapper data for mapping the submarine shelf of the Island Kerkennah

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Gulf of Gabes in Tunisia is unique among Mediterranean coastal environments by shallow water extension and tide amplitude. Kerkennah islands, located in this this gulf, are characterized by a -10 m isobath few kilometers away from the shoreline and by a lithology composition dominated by smooth rocks (sandstone and mio-plocene clay). These features, combined with a sea level rise and an active subsidence, constitute major risk factors. Islands vulnerability is increased by sebkha (salted low lands) extension which accounts now for 45% of the total area.
Thus assessing the littoral sea depth change is a key issue for risk monitoring. Our study relies on the 30 years archive of Landsat 5 TM sensor managed by GSFC/NASA. The depth assessment has been carried out by an empiric method based on TM1 channel which has the better water penetration properties (up to 25 m). We focused on summer period and selected images from July 1986, August 1987, June 2003 and July 2009. After a first step of data preprocessing to ensure data homogeneity, we produced sub-aquatic morphology change maps. The observed features (submarine channels enlargement, cells sinking) are consistent with the hypothesis of the ebb tide as the process leading phenomenon.