

## Coastal Geomorphology of the Persian Gulf in Kangan Harbor Using High Resolution Images

<sup>1</sup>Lut Desert-UNESCO World Heritage Centre, Kerman, Iran

<sup>2</sup>Department of Remote Sensing, University of Kerman, Iran

<sup>3</sup>Department of English Literature, University of Kerman, Iran

With a revolution in different sciences, especially during the last decades of 20<sup>th</sup> century, the range of quantitative coastal geomorphologic studies has exceeded the descriptive and theoretical debates. These studies have a critical contribution in designing structures and establishments related to sea, handling and protecting the coasts, managing and engineering and planning of coastlines. Kangan harbor is one of the littoral towns in Boushehr province located in southern Iran near the Persian Gulf. This harbor is an economic fishing quay throughout the country of Iran where several varieties of edibth fmj % bt Mwh á p m Pse a Å tá of this region and its transformations in the course of time has a signifcant importance in the future development of this region. In this study, in order to investigate coastal geomorphology of Kangan harbor, IRS LISS IV satellite images with a resolution of 5.8 m in Envi4.8 software were used and the accuracy of these data were reviewed with feld studies. Units of geomorphology of coastal sand dunes, estuaries, high and low tidal fats, sabkha and Mangrove forests were identified in this harbor.

### I

The science of geomorphology has a critical importance in the field of studying coastline transformations, sedimentation, coastal erosion and destruction, alterations, floods, protecting lagoons and estuaries and managing coastal region. Therefore, recognizing geomorphologic phenomena is a great help for the management of coastal areas. Coastal area refers to a wide area of land and sea where different phenomena with marine and land origins interact. This region is changing due to the actions of geological phenomena, ecological and hydrodynamic processes on the one hand and human constructions on the other hand.

The use of RS and GIS data in differentiating sedimentary environments and morphological evidence of coastal areas is growing during recent years [1].

Coastal zone monitoring is an important task in environmental protection, while coastline detection is fundamental for coastal management [2].

Attributes were identified according to the field experiments and visual observations of important geomorphologic phenomena. Also, Khodabakhsh et al. [1] classified coastal sedimentary areas in Khuzestan province by combining digital and visual methods. Using aerial photos, satellite images and GIS, studied the displacement of mud flats formed following a period of erosion and sedimentation along the coastlines of Iran. They found out that mud flats displacements occurred with erosion and sedimentation and temporal-spatial differences in its pattern. The impact of mud flats in morphological stability and coastal behavior were identified with statistical analysis. The position of coastlines in Chabahar gulf was investigated by satellite data for 13

of the tropical and mid-latitude weather systems) due to southern deserts, which surrounded it. The seasonal shifting of the tropical and mid-latitude systems leads to seasonal changes in the meteorological conditions [6]. During summers, sea level rises (0.5-1.0 m) and during winters, it falls (0.5-1.0 m) [10].



circulation often results in dusty air [9].

Although sandy hills in Chabahar area usually have marine origin, the wind transfer in this region provides sea and land breeze and strong winds with simultaneous seasonal winds which result in the movement of sandy hills and erosion of the coastal areas.

**F**  

**F**: Within the coastline skirts especially the area between Dayyer harbor to Kangan harbor, tide has a strong effect and has caused the formation of sedimentary at the junction of Delvar river to the sea due to low steep and geomorphologic environments. These regions are 1235 km<sup>2</sup> and cover 68% of the whole area. Tidal environments are divided into four regions which from land to sea include salt marshes, high tidal flats, low tidal flats and tidal channels.

**F**: Salt marshes are in high tidal flats and exist only during stormy events when the sea level rises and covers this area. This is the last part of the tidal environment toward the land. The sediments of this area mostly include silt and clay. In salt marshes, it is possible that small sedimentary channels in the form of branches be formed. This area is covered in grassy vegetation and sometimes marine animals can be seen there [10] (Figure 3).

**H**  : The sediments in these areas are mostly grits and clay and main features are small separated channels. Grassy vegetation is small in this area and is locally observed but marine animals are remarkably increasing [10] (Figures 4 and 5).



barriers towards the land and consecutively may see swamp, tidal silt and clay structures and organic materials and probably flood plain sediments [11]. Across some regions of the coastline, we can observe coastal barriers, the western coastline of Dayyer harbor, and southern Eli village and between northern Eli village and Kheira hill. The coastal barriers between Dayyer harbor and southern Eli village are in the form of Mangrove stability (Mangrove settlement) and construction of fishing harbor and a decrease in carrying strength of sediments are formed in long shore current direction of these barriers. The direction of waves contact with the coasts also contributes in the formation of sandy barriers. In the area between northern Eli village and Kheira hill, the formation of these barriers may be observed and their extension is in the direction of marine currents. If this phenomenon continues in the future, we will see the formation of sandy (grit) hills and lines (Figures 8 and 9).

Along the coastline of the study area, we can observe sandy hills from Kangan harbor to Bouhmir estuary which locally placed behind the rubble stone and sandy coasts (Figures 10-13).

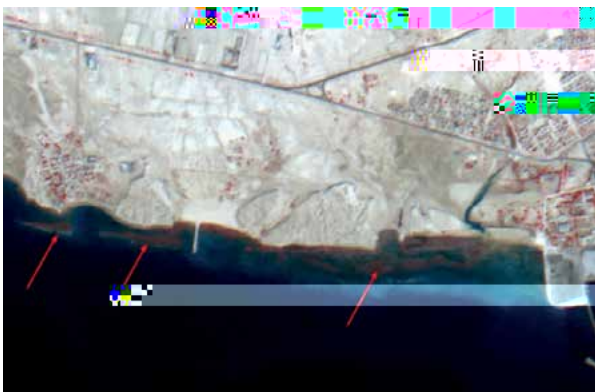
Geomorphologic research on grit grains across different sandy hills show that the constituent grits of these hills are locally the result of the destruction of present attributes in surrounding areas and the tides which are distributed during strong wind and aquatic phenomena as well as travelling through the coastal plain to the coastline. It means that a further destruction of attributes, the resulting materials are carried



Deposition of sand in Dayyer Port.



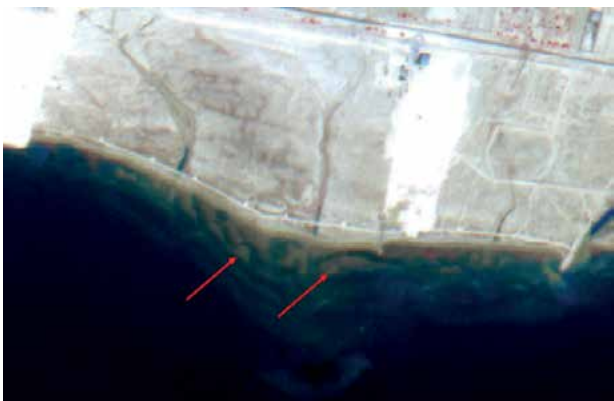
Sand dunes and shingle beach of Kangan.



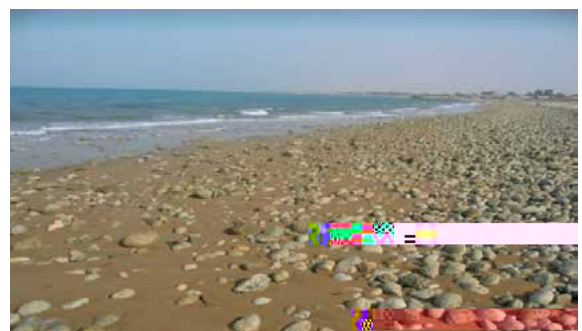
Construction of Barrier on west coast of Dayyer Port.



The coastline of the rubble stone area.



Barrier between northern Eli village and Kheira.



Shingle Beach on Kangan Coast.



