

## **Changes of Penang coastal areas from 1980 to 2000: view from the sky**

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Land reclamation and coastal development are two major factors contributing to coastal changes in Penang. To map such changes over a large area using conventional surveying technique is time consuming and expensive. With the advent of remote sensing technology, synoptic view of the area can be mapped in a relatively very short time from airborne and space-borne platforms. Spatial details can be obtained depending on the type of sensors used and the height of the observations. In this study, coastal changes of Penang coastlines from 1981 to 2000 were mapped using remote sensing images. The data from aerial photographs (taken in 1981), SPOT panchromatic image (captured in 1996) and SPOT Multispectral image (acquired in 2000) were used to see such changes. The photographs were scanned to convert the data to digital images. SPOT 1996 was used as the reference image due to its large coverage and fine pixel resolution. The 1981 and 2000 images were registered to the corresponding 1996 SPOT image based on selected control points. The images were then resampled using the nearest neighbor technique. In order to see the changes, the time series images were overlapped and the coastlines were traced. The land areas covered by those changes were estimated. This technique is found to be simple and cost effective for such environmental studies.