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Changes in the Yellow River Delta, 1989-2000

China's Yellow River Delta is one of the fastest changing coastlines on Earth. Two factors contribute to the changes: 1) the river carries a heavy sediment load, leading to clogged channels and frequent river course changes; 2) the river is heavily engineered and water is oversubscribed, resulting in little flow to the coast in recent years.

Dramatic changes in the tip of the Yellow River delta were documented by astronauts on the Space Shuttle between 1989 and 2000. Over this time, several hundred square kilometers accreted and eroded from the coast. The delta grew nearly 400 km² between 1989 and 1995, then began eroding back. Between 1995 and 1997, the delta area eroded back about 255 km². In 1997 a new channel was cut near the tip of the delta. From 1997 to February 2000, the delta tip again grew nearly 100 km².

Using the Yellow River delta as an example, we will discuss how remote sensing and image analysis of astronaut photographs are efficient strategies for examining regional changes like coastline evolution. Photographs collected by astronauts were assembled in a time series of images demonstrating both the scale and specific locations of coastal change. The images were referenced to standard maps, allowing for quantitative measurements of changes.

Documentation of delta changes will continue from the International Space Station. We are targeting several rapidly changing coastlines in southeast Asia, including the Yellow River Delta.