TRANSPORTATION OF SEDIMENTS ON THE CONTINENTAL SHELF

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ABSTRACT

The chief agents responsible for the movement of sediments on the continental shelf are the winds, the waves, the tides, and gravity. This transportation of material takes place in both traction and suspension, with suspension relatively more important than in stream work because of the turbulence and agitation set up by wave action.

The principal agents of transportation away from shore are rip currents, tidal currents, and undertow. Those causing transportation toward shore are tidal currents, subsurface currents toward shore resulting from offshore winds, and waves of oscillation and translation.

Beside carrying material in suspension and ordinary traction, the waves move material toward shore on the bottom in subaqueous dunes and asymmetrical ripples. In subaqueous dunes, the forward movement is caused mostly by waves of translation forcing material forward across the top of a submerged

ridge and depositing it on the lee side. This is an important cause of cross lamination in sandstones.

Asymmetrical ripple marks are caused by the unequal alternating currents set up on the bottom by the deformed waves in the breaker zone. Due to the stronger surge on the bottom in the direction of wave movement, they travel forward over the bottom toward the shore carrying the sediment with them. Sometimes onshore movement predominates on the shelf and sometimes it is reversed. But, on the average, the land loses more material to the sea than is returned to it.