

## CRITERIA FOR DISTINGUISHING BETWEEN ASYMMETRICAL WAVE-FORMED RIPPLE MARKS AND CURRENT-FORMED RIPPLE MARKS

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### ABSTRACT<sup>1</sup>

Current-formed and asymmetrical wave-formed ripple marks are both formed on the bottom of shallow-water bodies and so are sometimes found preserved close together in sedimentary rocks. As this relationship may give valuable information regarding the conditions of deposition at the time of formation it is important to know the characteristics by which they may be distinguished one from the other.

*Differences in longitudinal axes.* The axes of ripples formed by waves of oscillation are straight or, if curved, the curves are long and uniform and the axes of such a series have a large degree of parallelism. In current-formed ripples the longitudinal axes are not parallel and each individual ripple is crooked and irregular.

*Differences in the angles at the top and bottom of the lee slope.* A wave-formed asymmetrical ripple shows a rounded condition of the crest and base. Current-formed ripples are frequently sharply angular at the crests and bases and are always so if the current is of sufficient velocity to cause a steady flow of a majority of the sand grains.

*Differences in uniformity of the height of the crest of the ripples above their troughs.* There is very little variation in the elevation of the crests above the troughs along the axis of wave-formed ripples but with current-formed ripples both the crests and the troughs are very irregular in height.

*Differences in the shape of the ripples in the vicinity of obstructions.* Waves build ripple crests across flat rocks or similar materials on the bottom with little or no sediment in the troughs. A current sweeps such surfaces clean. If the rock projects some distance above the bottom wave-formed ripples will end close against the sides of it but currents cause a digging out around the rock and in that case the near ends of the ripples are irregular and generally point down stream.

*Differences in lunate ripples.* In the zone of waves of translation close to the shore ripples are often broken up into segments which have their tips pointing toward shore. Such ripples have crests and troughs of uniform elevation and width. Horseshoe-shaped ripples are often formed by currents but they have their ends pointing either up stream or down stream and their crests vary greatly in height.

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