Scientist finds alternate explanation for dune formation on Titan

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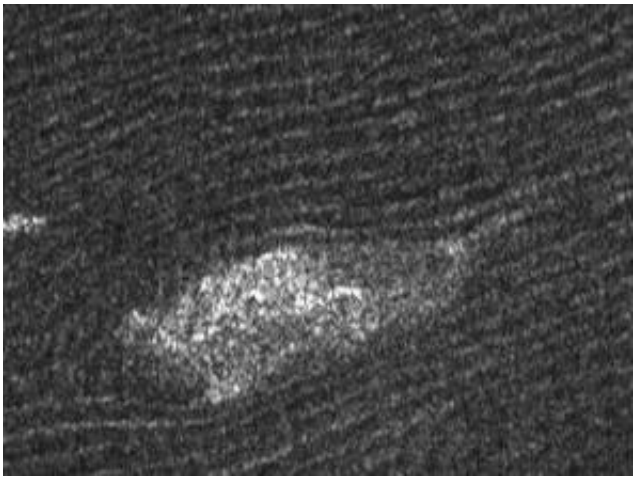

Detail from a Cassini radar image of sand dunes on Titan. (Photo: NASA/JPL)

A new and likely controversial paper has just been published online in *Nature Geoscience* by LSU Department of Geography and Anthropology Chair Patrick Hesp and United States Geological Survey scientist David Rubin. The paper, "Multiple origins of linear dunes on Earth and Titan," examines a possible new mechanism for the development of very large linear dunes formed on the surface of Titan, Saturn's largest moon.

The authors examined the linear - or longitudinal - dunes that stretch across the surface of China's Qaidam Basin, finding them composed of sand and some salt and silt. The latter two elements make the dunes cohesive or sticky.

According to the study, this leads to a complete change in dune form from transverse dunes to linear dunes, even though the wind speed and direction does not change. Typically transverse dunes are formed by winds from a narrow directional range while longitudinal or linear dunes are formed by winds from two obliquely opposing directions. These findings offer an alternative interpretation of similar dunes found on Titan.

Hesp and Rubin suggest that if the giant linear dunes found on the surface of Titan are also formed from cohesive sediment, then they too could be formed by single-direction winds. This is in sharp contrast to earlier studies, which assumed that the sediments were loose and interpreted the dune shape as evidence of winds coming from alternating directions.

The alternative hypothesis that Titan's linear dunes are formed in cohesive sediment has significant implications for studies on Titan; if the Hesp and Rubin alternative is correct, new hypotheses regarding the composition, origin, evolution, grain size, stickiness, quantity, global transport patterns and suitability for wind transport of Titan's sediment; the velocities, directions and seasonal patterns of Titan's winds; and overall surface wetness will all have to be completely reassessed.

Source: Louisiana State University (news : web)