The largest wind ripples on Earth: COMMENT

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The dominance of aeolian features on the surface of Mars requires a better understanding of potential terrestrial analogs to provide constraints on models of origin. In his timely article, Milana (2009) describes the largest wind ripples on Earth from the Puna plateau of Argentina. Inverting morphometric parameters and sedimentological observations, he discusses implications for the development of large ripples on Earth and Mars. Critically, Milana neglects the ballistic reptation (creep) hypothesis (Anderson, 1987) in favor of wind-flow characteristics for the development of these ripples. If correct, these inferences will have a major impact on our understanding of ripple formation. I am also familiar with these ripple fields as part of my work to understand the Altiplano-Puna as an analog laboratory for Mars (Mandt et al., 2008, 2009; de Silva et al., 2009). I find that important sedimentological and geological relationships of these megaripples have been ignored by Milana, and that his interpretation of a direct genetic relationship between the largest ripples and bedrock topography is in error. His assertions about the origin of megaripples on Earth and Mars are therefore questionable.

Missing from Milana’s report is the context that the ripple fields occur within, broadly north-south elongate lows flanked by highs of young ignimbrites of the Purulla and Campo Piedra Pomez areas (70–13 ka; my unpublished 40Ar-39Ar data) that are spectacularly dissected into yardangs. Comparison of components in the ignimbrites and gravels indicates that the ripples are produced by reworking of a lag gravel from deflation of the ignimbrites (de Silva et al., 2009). This is inconsistent with one of Milana’s (2009, p. 343) key assertions that “mature ripples are partly exca-
vated in bedrock.” My observations are that the troughs in the bedrock are the ignimbrites (de Silva et al., 2009). This is inconsistent with one of Milana’s (2009, p. 343) key assertions that “mature ripples are partly exca-
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Moreover, ignimbrite bedrock surfaces without gravels show significant differences in the development of ripples on Earth as compared to Mars. The Puna gravel ripples forms are indeed spectacular and they may be, as Milana claims, the largest wind ripples on Earth. However, contrary to Milana, I do not find a genetic relation between bedrock surface and ripple formation. I find that the sedimentological and physical character of the Puna gravel megaripples is consistent with formation by creep and subsequent coarsening, bringing into question Milana’s disregard of this mechanism and his conclusions about megaripple formation on Earth and Mars.

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REFERENCES CITED


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