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Dunes on Titan : Cassini RADAR Observations and implications for Titan Winds and Surface Evolution

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The Cassini RADAR instrument has imaged Titan's surface on four occasions to date. The most recent SAR imaging has revealed quite beautiful patterns of what appear to be longitudinal dunes on Titan's surface. These appear in several distinct optically- and radar-dark regions, the largest being some 200x1500km in area. Some of the features are simply dark streaks, typically a few tens of km long, but others have a clear topographic expression.

The orientation of the dunes reveals the pattern of the net Aeolian transport direction, placing constraints on the near-surface winds. Additionally, the fact that the dunes are longitudinal (revealed by their interaction with underlying topography) also indicates the winds are not uniform with time. Furthermore, the large area of the dune field and the substantial size of the dunes (of order ˜100m high, from radarclinometry and by analogy with similar features on Earth e.g. in the Namib desert) requires a substantial inventory of sand-sized material to have been produced on Titan.

The source of the sand material, and the implications for the wind field will be discussed. Cassini data will be compared with spaceborne radar imagery of terrestrial analogs.