CONTROL ID: 2567772

TITLE: Detection of Northern Hemisphere Transient Baroclinic Eddies in REMS Pressure Data at Gale Crater Mars

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): Wintertime transient baroclinic eddies in the northern midlatitudes of Mars were identified in Viking Lander 2 (VL2, 48.3N, 134.0E) surface pressure data back in the early 1980s. Here we report the results of an analysis of REMS surface pressure data acquired by the Curiosity Rover in Gale Crater (4.5S, 137.4E) that suggests the meridional scale of these eddies is so large that the disturbances in the surface pressure fields they create extend across the equator and into the southern hemisphere. A power spectrum analysis of the seasonally detrended REMS pressure data from L_s=240-280 shows dominant periods of ~ 6 sols and ~2.2 sols (though with greatly reduced power) which are close the dominant periods of the transient eddies observed by VL2 at this season. Analysis of the surface pressure fields from the Ames Mars GCM for the same season also shows dominant periods at the grid points closest to VL2 and Gale Crater similar to those observed. In the model, the disturbances responsible for these oscillations are eastward traveling baroclinic eddies whose amplitudes are greatest at northern mid latitudes at this season, but whose meridional extent does indeed extend into the low latitudes of the southern hemisphere. REMS appears to be seeing the signature of these eddies, not only for this season but for the early fall and late winter seasons as well. While orbital images of the so called “flushing storms”, which more closely correspond to the shorter period waves, show dust-lifting frontal systems that cross the equator, REMS data - even though acquired at a longitude of comparatively weak storm activity - provide the first in-situ evidence that northern hemisphere transient eddies can be detected at the surface in low latitudes of the southern hemisphere.

CURRENT CATEGORY: Mars: Atmosphere

CURRENT : None

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