Supplementary Figures (A1 – A8) for

Equatorial Waves Associated with Dust Storms as Simulated in a Mars General Circulation Model

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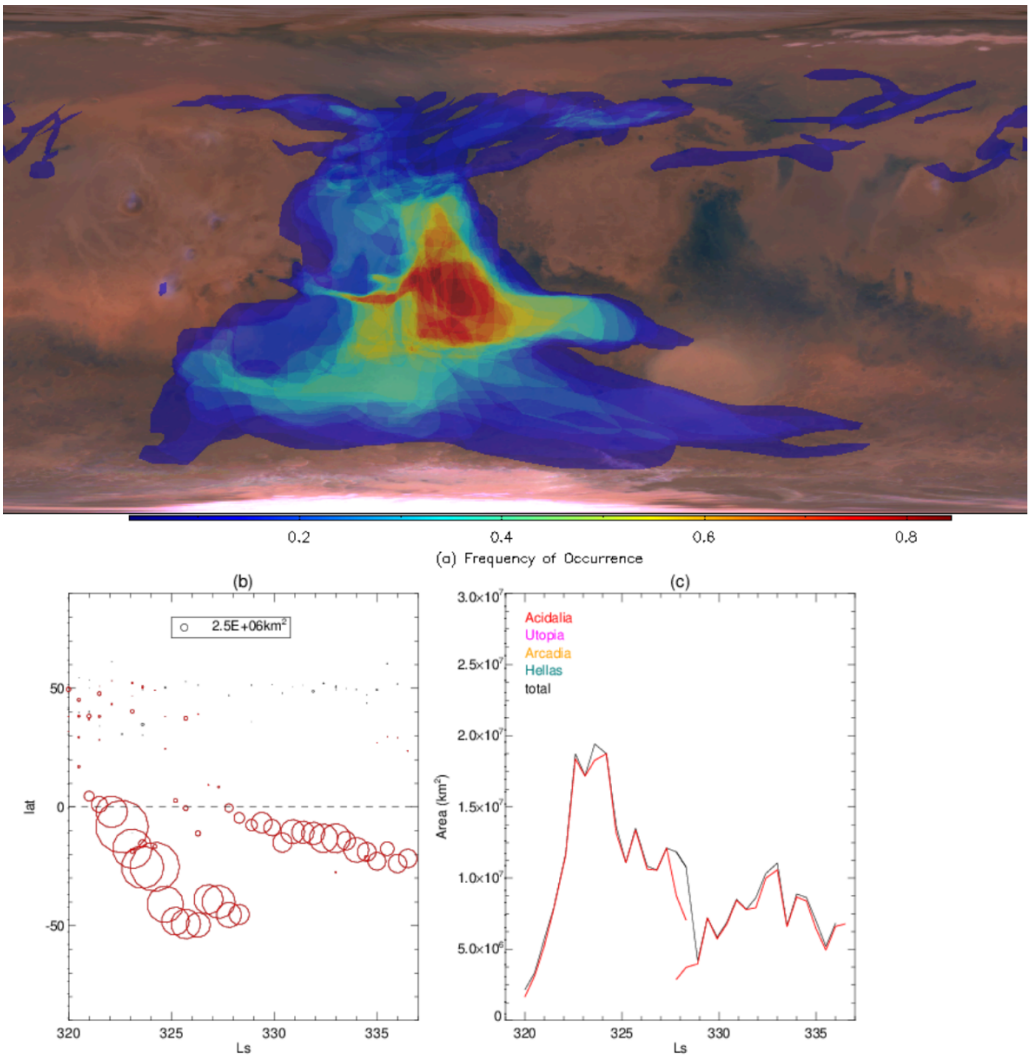
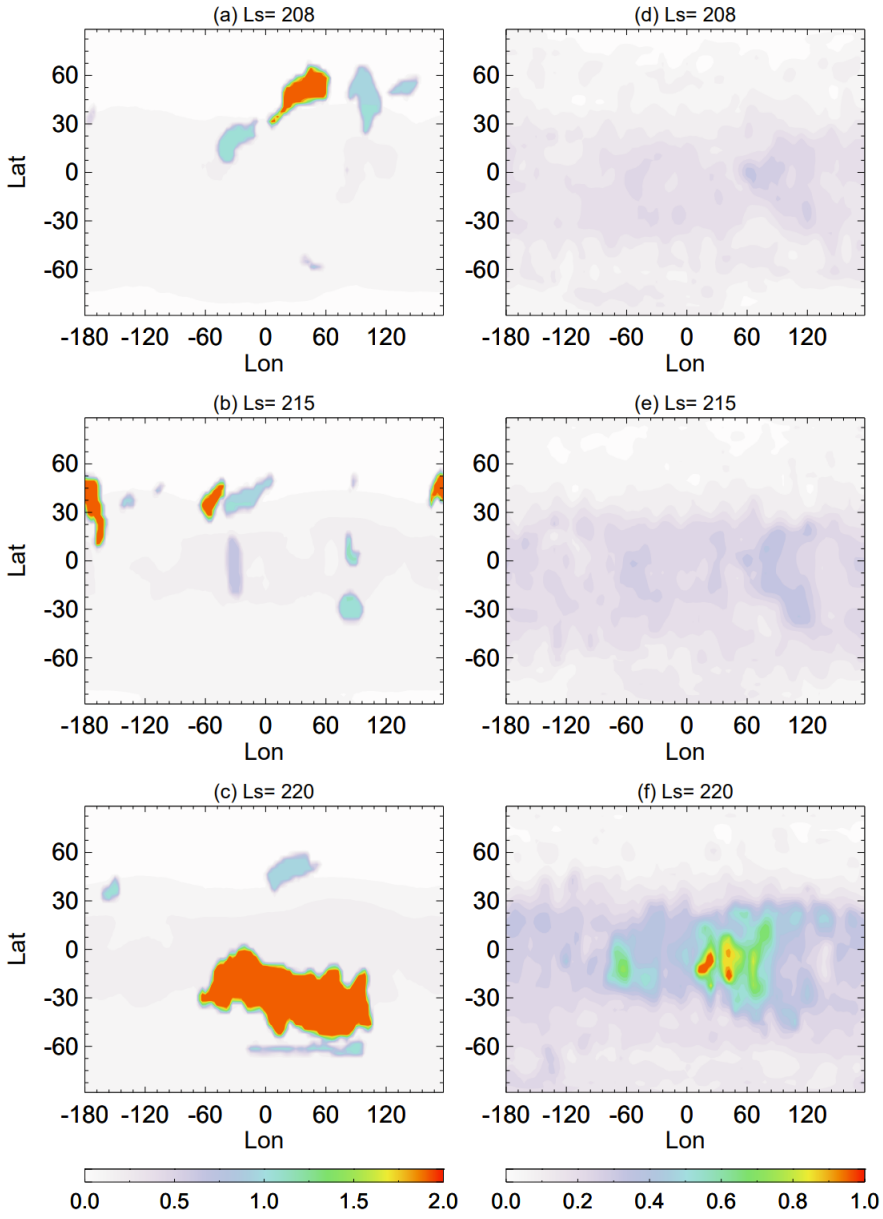
This file includes screen shots and figure captions of all the supplementary figures.

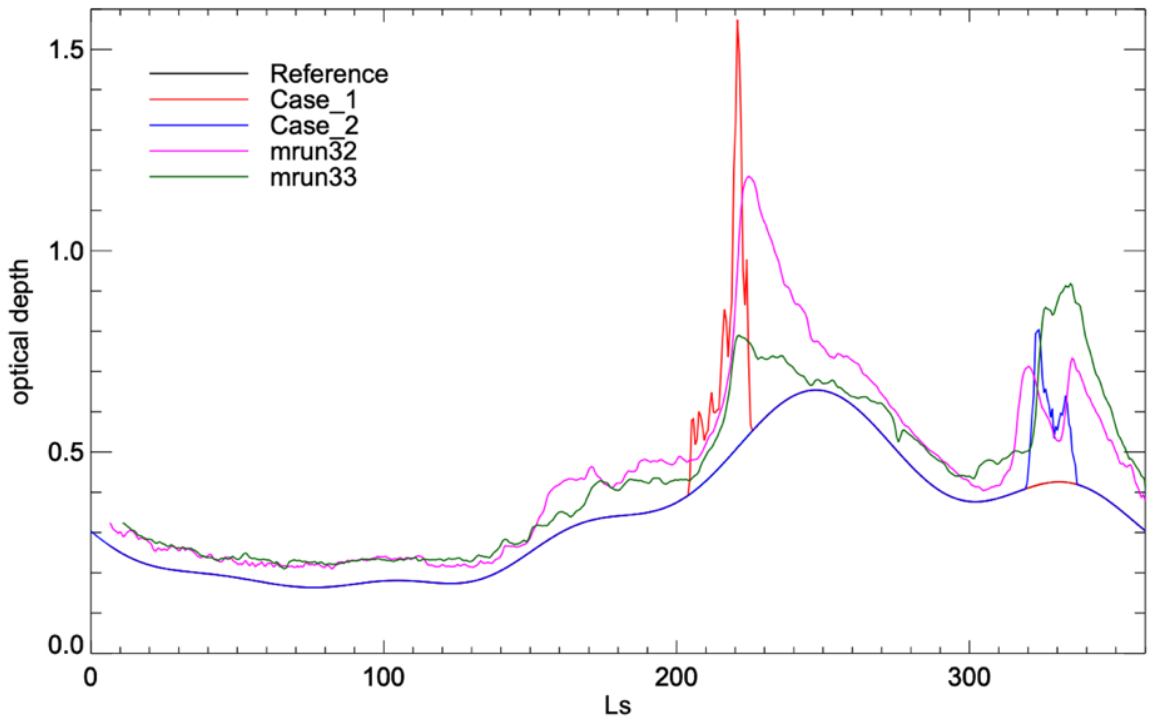
Individual supplementary figures are also uploaded in the supporting material dataset.



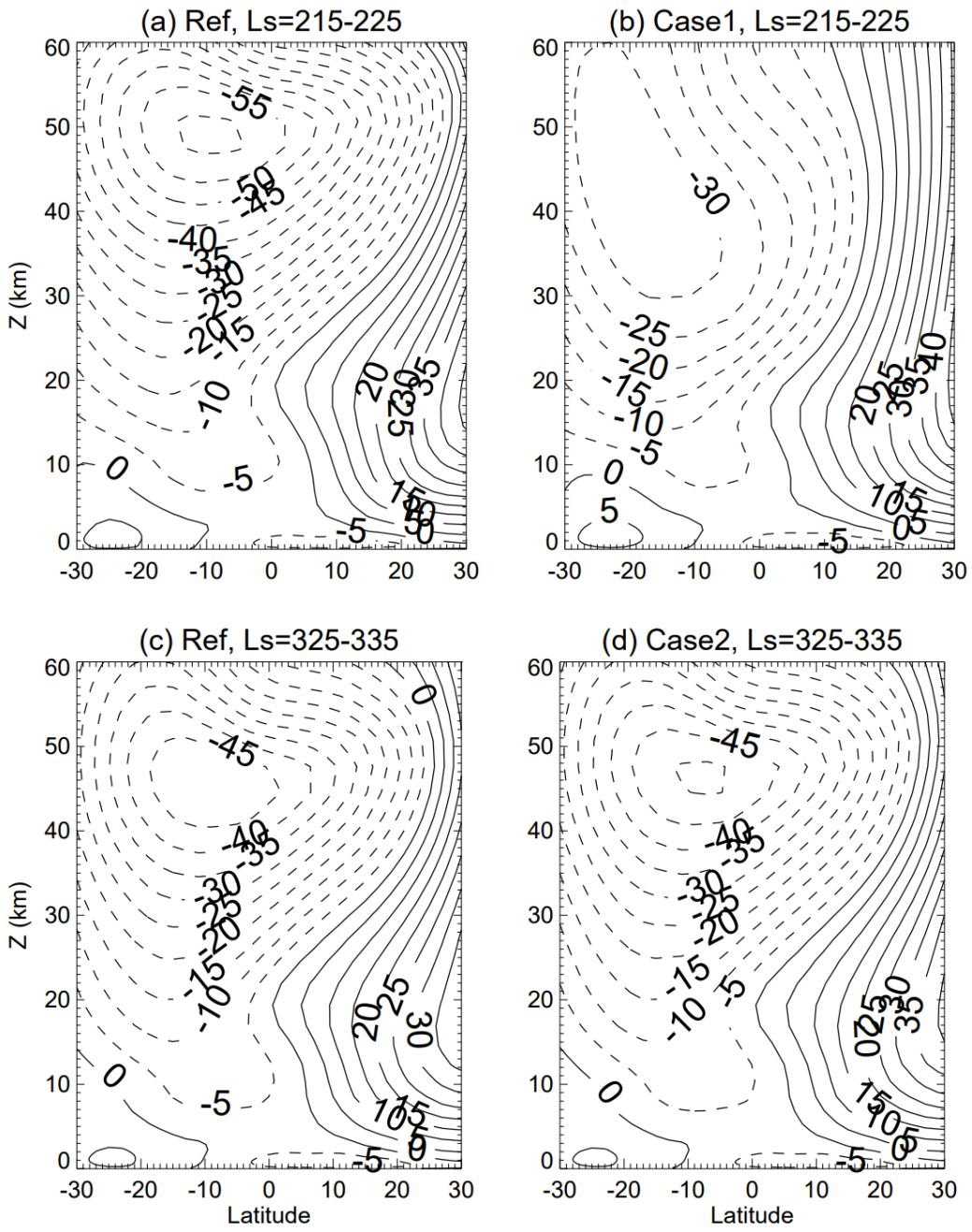
SFig. A1. Dust storm episode during L_s = 320º – 335º of MY 33. (a) Latitude – longitude distribution of storm occurrence frequency as illustrated by storm occurrence frequency during the L_s interval. (b) Latitude – L_s distribution of the centroids of dust storm members. Symbol sizes are proportional to storm areas. Symbol colors have the same meanings as those in Panel (c). (c) Area (km^2) a function of L_s during the episode. Color keys indicate the origination regions of dust storm sequences. Black line corresponds to the sum of all dust storm sequences.



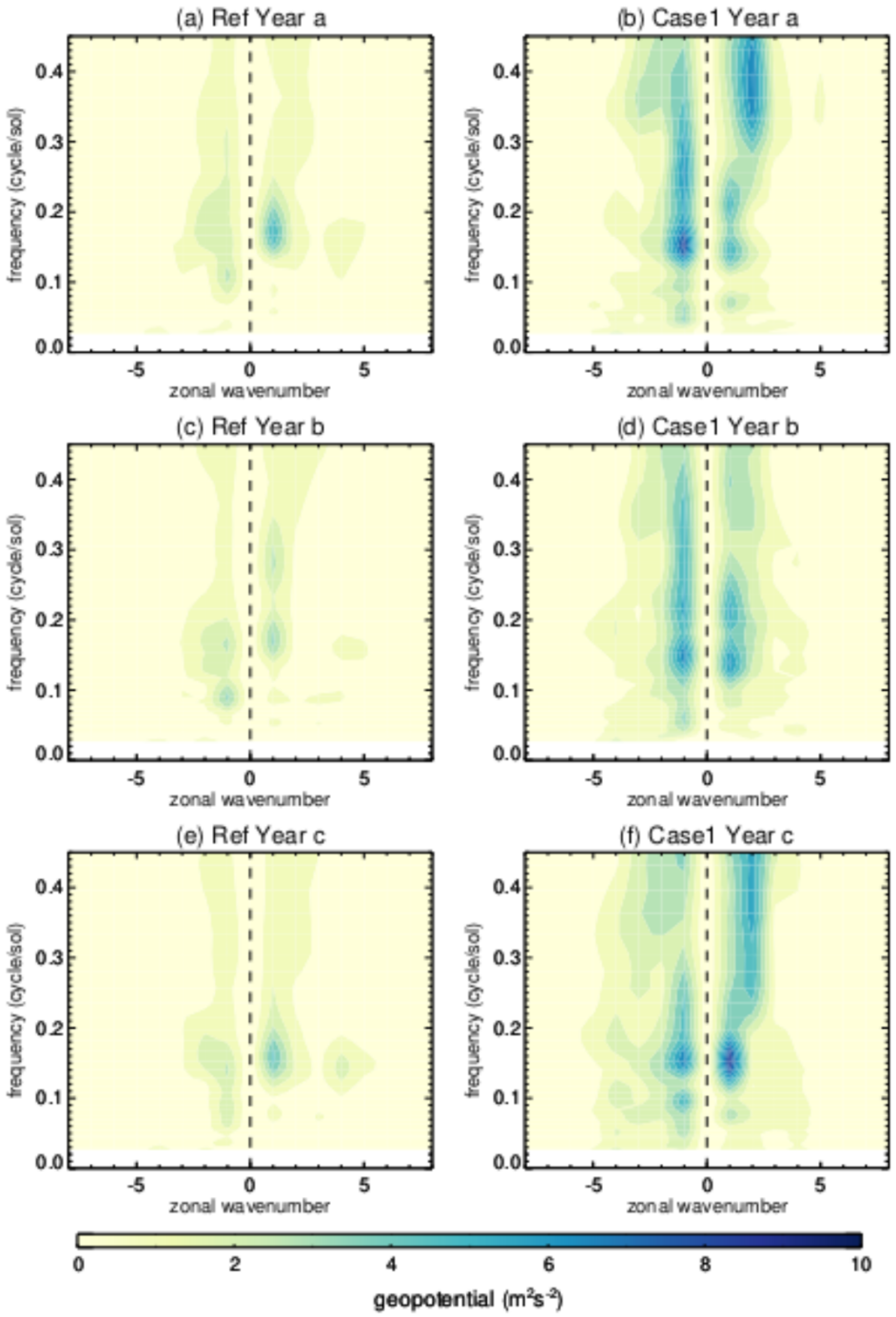
SFig. A2. Latitude – longitude distribution of 9.3 μm absorption dust optical depth (scaled to 610 Pa) at (a,d) L_s = 208°, (b,e) L_s = 215°, and (c,f) L_s = 220° prescribed for (a - c) Case1_MY32A and (d - f) Climatology32. For (a-c), the background dust is from the "no_storm" dust scenario. The imposed dust storm members are from the dust storm episode during L_s = 205°-225° of MY 32 in MDSSD. For (d – f), the MY = 32 climatology of L. Montabone et al. [2015] is plotted.



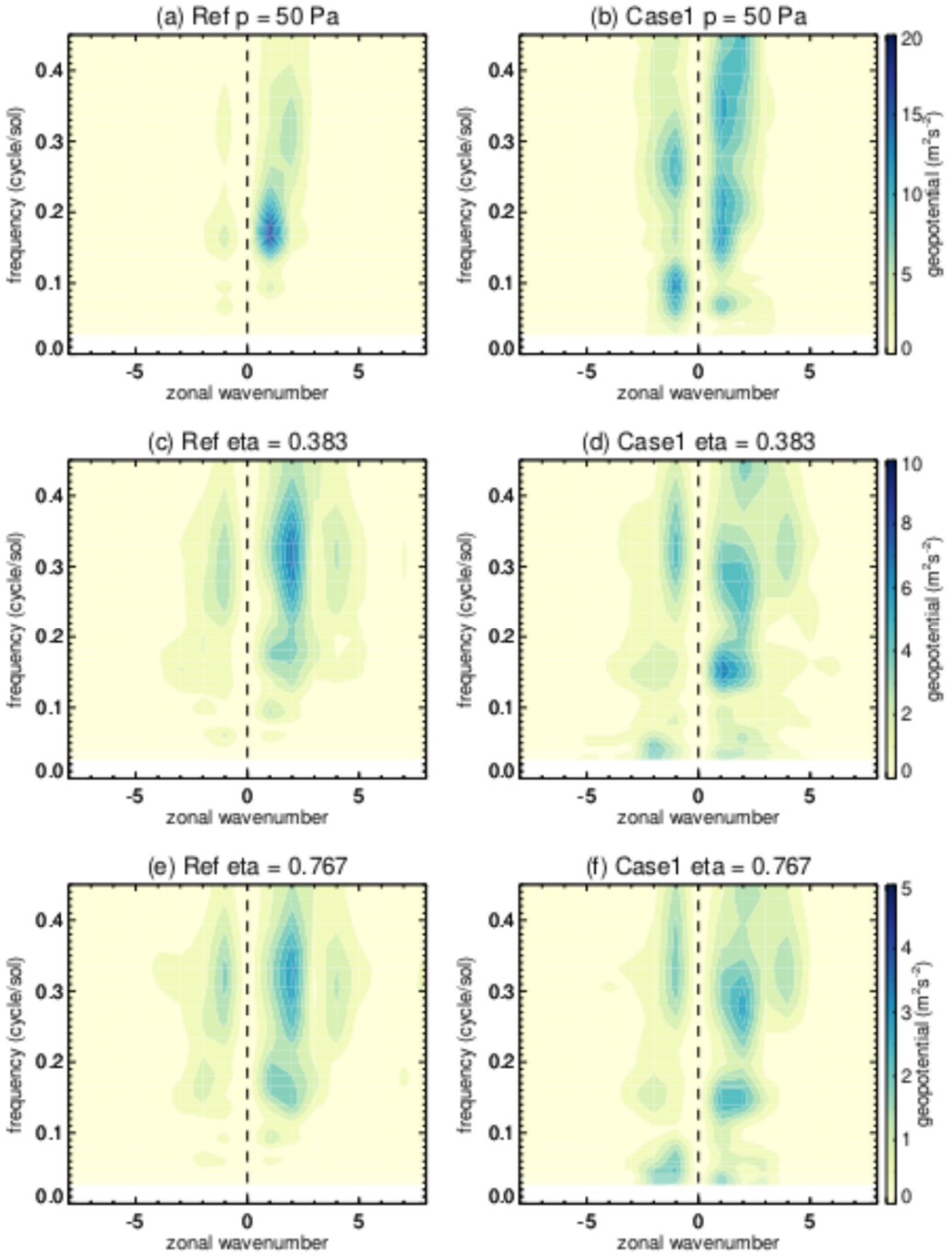
SFig. A3. Globally averaged dust optical depth CDOD610 (as defined in L. Montabone et al., [2015]) as a function of L_s for (black) Reference, (red) Case1_MY32A, (blue) Case2_MY33C, (magenta) MY 32 climatology, and (green) MY 33 climatology, as listed in Table 1 of the main text.



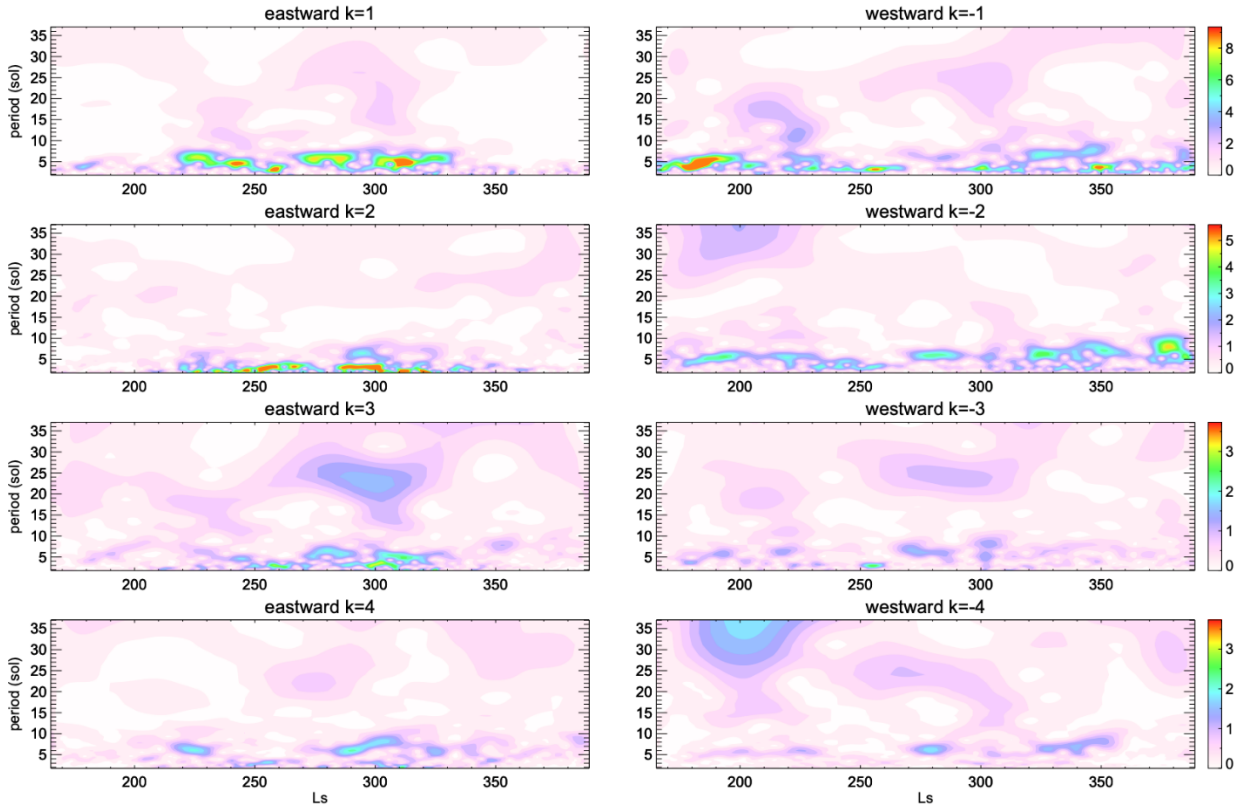
SFig. A4. Altitude (Z, km) versus latitude (degree) cross sections of zonal mean zonal wind (m/s) averaged within (a, b) L_s = 215° – 225° and (c, d) L_s = 325° – 335° for (a, c) Reference, (b) Case1_AcidaliaA, and (d) Case2_AcidaliaC simulations.



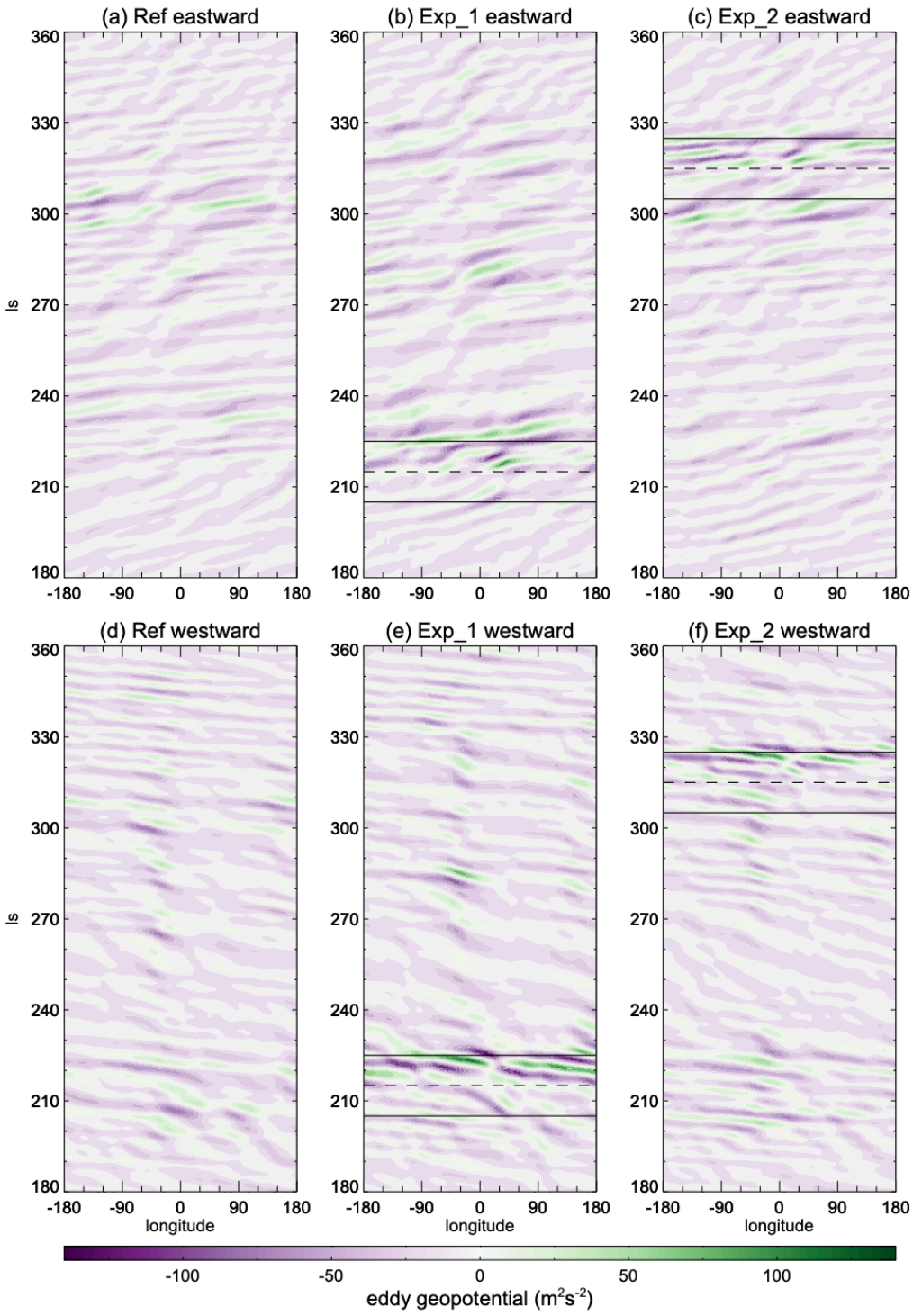
SFig. A5. Wave amplitude for p = 100 Pa geopotential ($m^2\ s^{-2}$) as a function of wave frequency (cycle/sol) and zonal wavenumber for the (left column) Reference run and (right column) Case1_MY32A run for (a, b) Year a, (c, d) Year b, and (e, f) Year c. Positive (negative) zonal wavenumbers correspond to eastward (westward) propagating waves. Each spectrum is averaged between 15°S and 15°N during L_S = 215° – 225°. Results are for comparison with Fig. 5ab.



SFig. A6. Geopotential wave amplitude ($m^2\ s^{-2}$) as a function of wave frequency (cycle/sol) and zonal wavenumber for the (left column) Reference run and (right column) Case1_MY32A run for (a, b) *p* = 50 Pa (Z ~ 30km), (c, d) η = 0.383 (h ~ 10 km), and (e, f) η = 0.767 (h ~ 3km). Note differences in color bar scales. Positive (negative) zonal wavenumbers correspond to eastward (westward) propagating waves. Each spectrum is averaged between 15°S and 15°N during L_S = 215° – 225° of the same year as Fig. 5.



SFig. A7. Wave amplitude of p = 100 Pa geopotential (m^2 s^{-2}) averaged between 15°S and 15°N as a function of wave period (sol) and L_s for the Reference run. Left and right columns are for eastward and westward propagating waves, respectively. Panels from top to bottom are for zonal wavenumber from 1 to 4, respectively.



SFig. A8. L_s – longitude plot of (top row) eastward and (bottom row) westward propagating waves with wave periods of P = 7 – 30 sols in the *p* = 100 Pa geopotential (m^2 s^{-2}) field at 1º S for the (left) Reference, (middle) Exp1_Acidalia32A and (right) Exp2_Acidalia32C runs. Solid lines bracket the L_s period when dust storms are superposed. Dashed lines correspond to occurrence of dust storm members near the equator.