

Supplementary material

PV and θ -tracer budget for TC Katrina

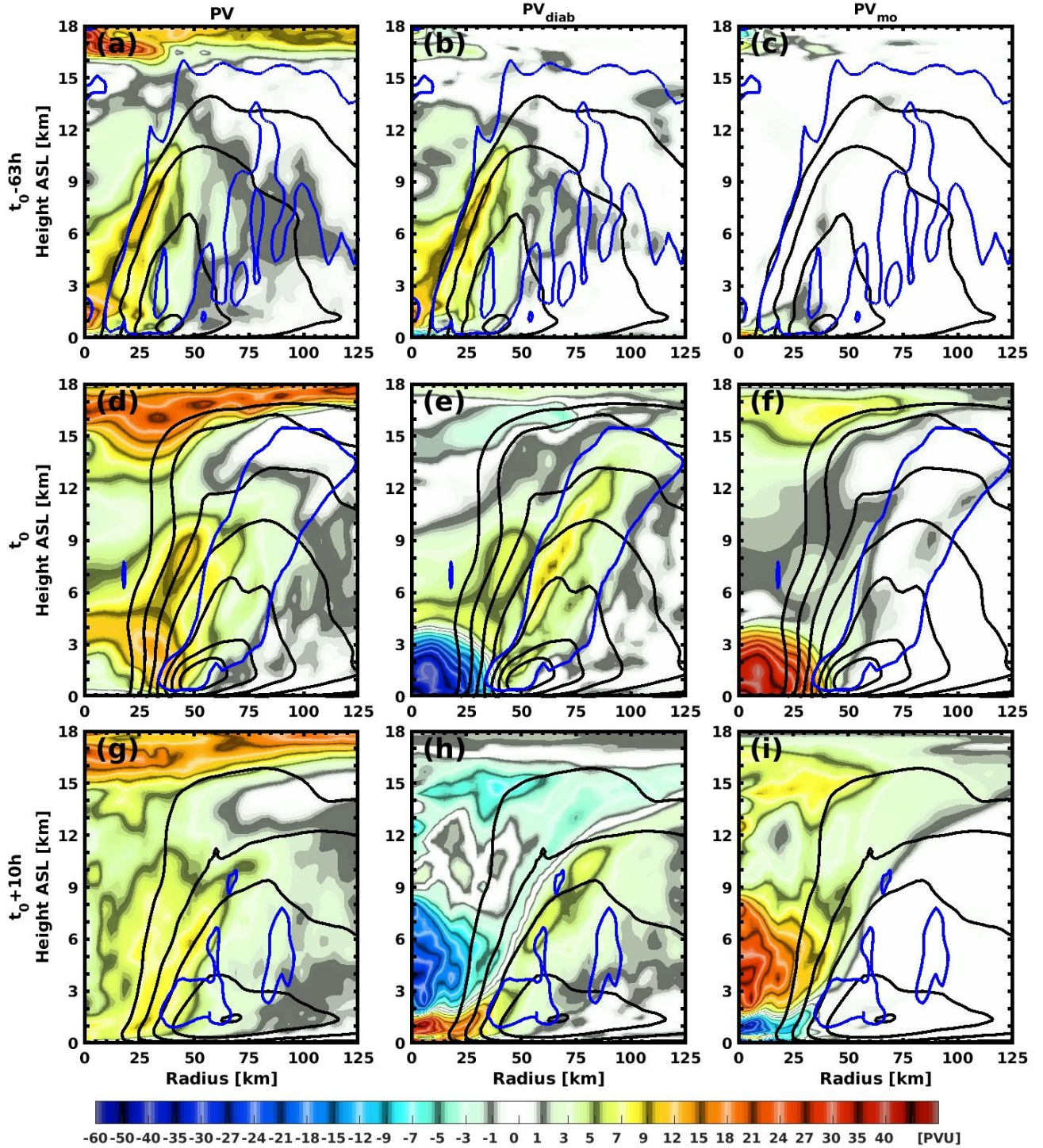


Fig. S4 Similar to Fig. 3 in the article, here we show vertical-radial distribution of winds and PV components in TC Katrina. Colour shading is total PV, PV_{diab} and PV_{mo} in the left, middle and right columns, respectively. Each row of panels refers to different times with respect to the mature stage (t_0). Panels also show azimuthal mean tangential wind speed (in black contours every 10 m s⁻¹, starting from 20 m s⁻¹) and vertical wind speed for 0.25 m s⁻¹ and 0.75 m s⁻¹ (in blue contours).

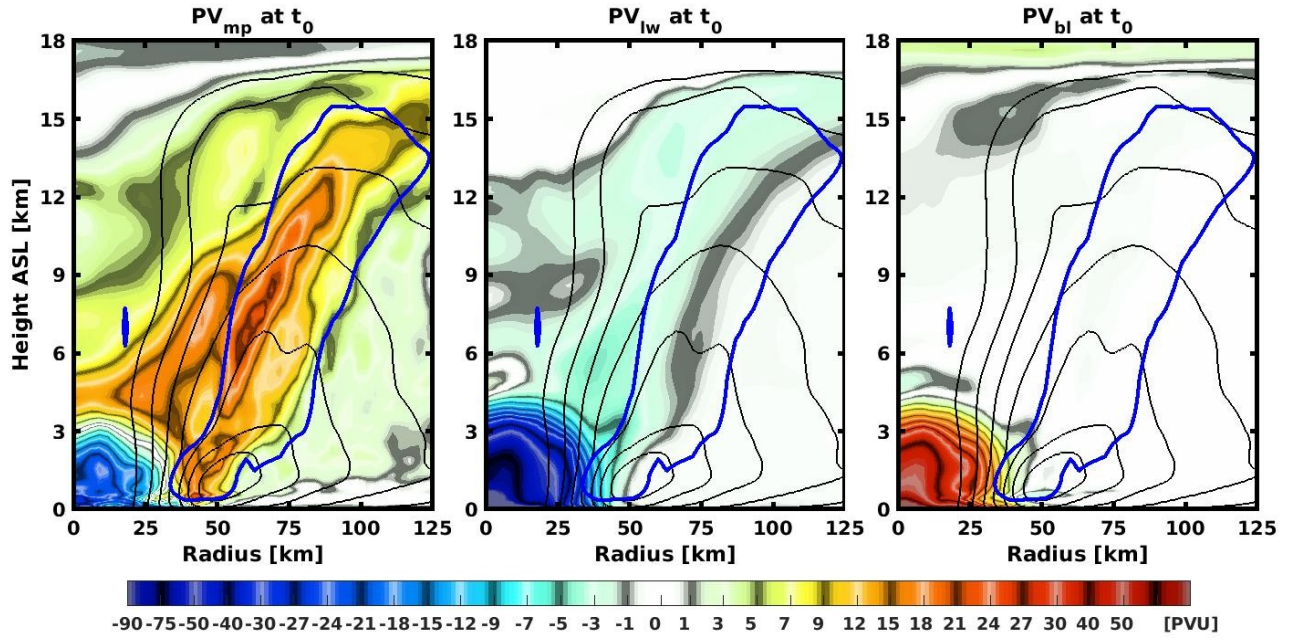


Fig. S5 Similar to Fig. 4 in the article showing PV_{mp} , PV_{dlw} and PV_{bl} (in colour shading) at the time of Katrina's mature stage (t_0) only. Note that the colorbar limits are different for PV_{mp} . Note that colorbar limits are larger than in Fig. 4.

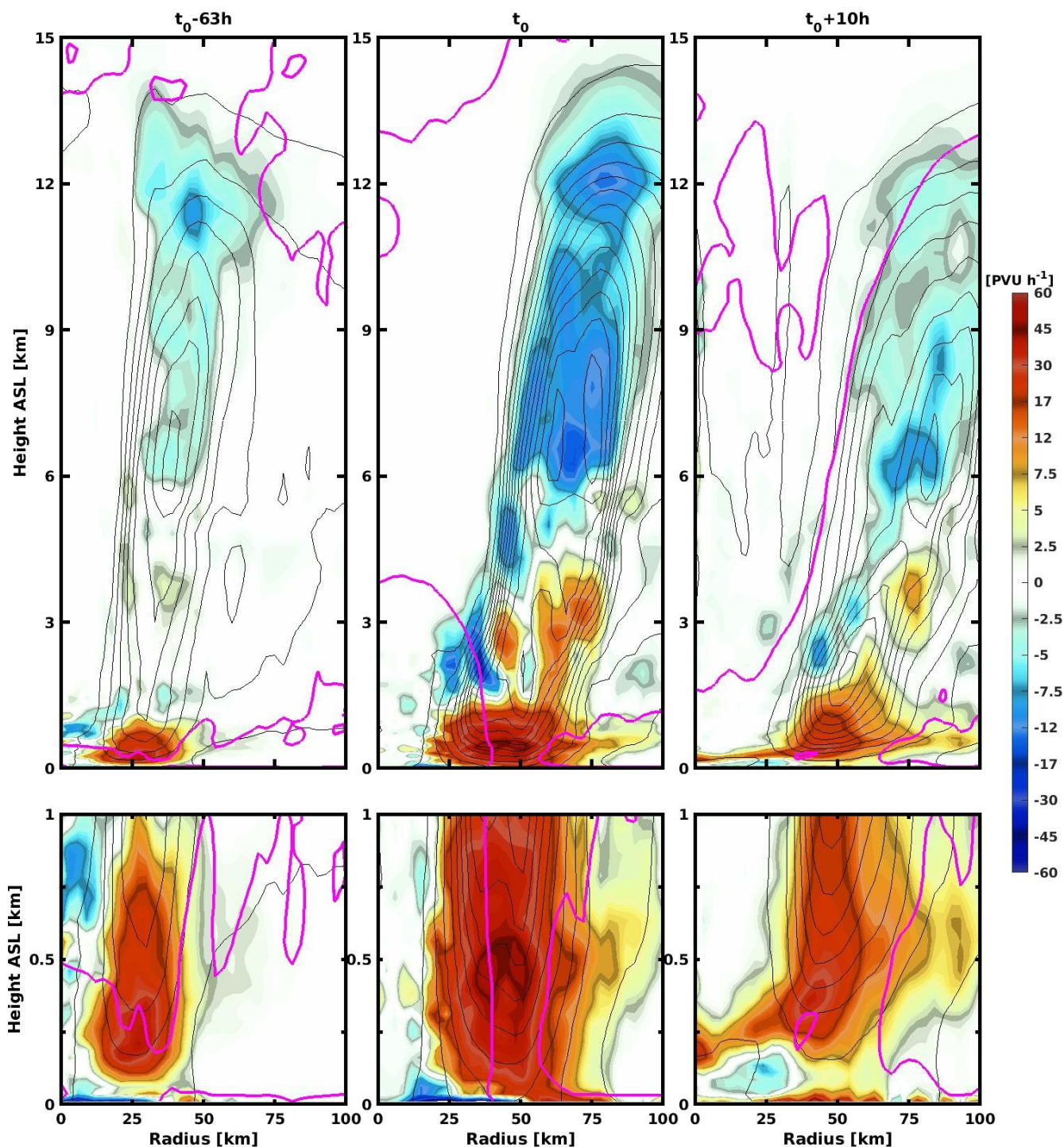


Fig. S6 Similar to Fig. 5 of the article showing the vertical-radial distribution of the azimuthal mean of diabatically produced PV tendencies (G_{diab} in eq. 3, shown in colour) for TC Katrina at the three selected times. Solid black contours represent T_{diab} with an interval of 3 K h^{-1} , starting from 1 K h^{-1} . All fields are averaged over the six hours preceding the times indicated in the title, where t_0 marks the mature stage. To delineate the inner-core (see text), the magenta contour represents the zero isoline of 6-hourly average PV_{diab} prior to the times shown in the top panel titles. The bottom panels provide a zoomed-in view of the first km asl shown in the top panels.

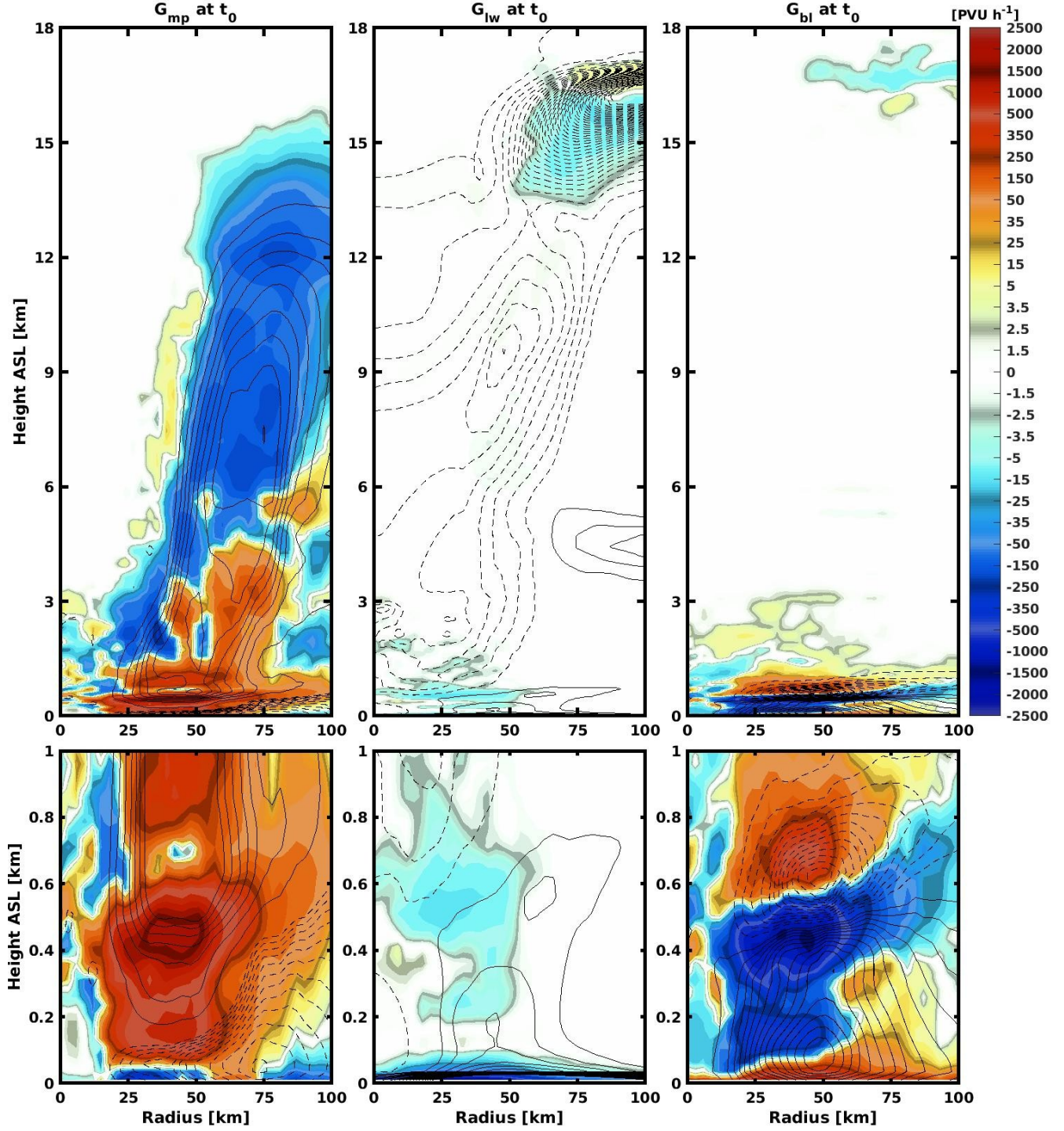


Fig. S7 As for Fig. 6 but for the azimuthal mean G_{mp} (left panels), G_{lw} (middle panels) and G_{bl} (right panels) in colour shading with the corresponding values of temperature tendencies (T_{mp} , T_{lw} , T_{bl}) in black contours. Contour intervals are different in each panel. Left panel: every 60 K h^{-1} (-5 K h^{-1}) for positive (negative) values; Middle panel: every 0.5 K h^{-1} (-0.5 K h^{-1}) for positive (negative) values; Right panel: every 10 K h^{-1} (-10 K h^{-1}) for positive (negative) values; all averaged over the six hours preceding t_0 .

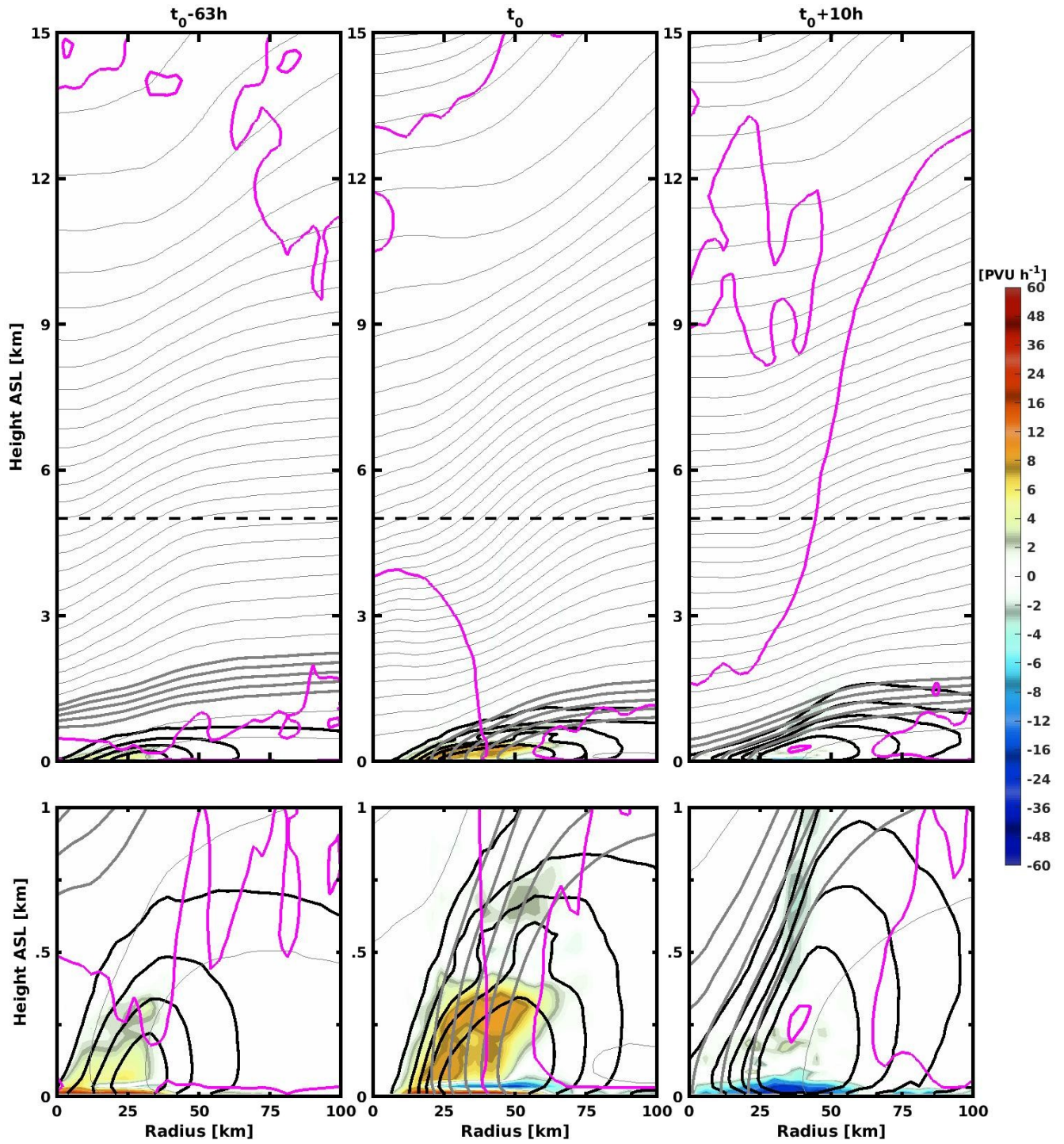


Fig. S8 As in Fig. 7 of the article showing vertical-radial distribution of the azimuthal mean of momentum produced PV tendencies (G_{mo} in eq. 3, shown in colour) for TC Katrina at the three selected times. Black contours represent azimuthal mean tangential F with intervals of -10, -7, -5, -3 and -1 $m \ s^{-2}$ and grey contours represent θ with an interval of 1 K, starting (thicker contours are used for values between 306-310 K). All fields are averaged over the six hours preceding the times indicated in the title, where t_0 marks the mature stage. To delineate the inner-core (see text), the magenta contour represents the zero isoline of 6-hourly average PV_{diab} prior to the times shown in the top panel titles. The bottom panels provide a zoomed-in view of the first km asl shown in the top panels.

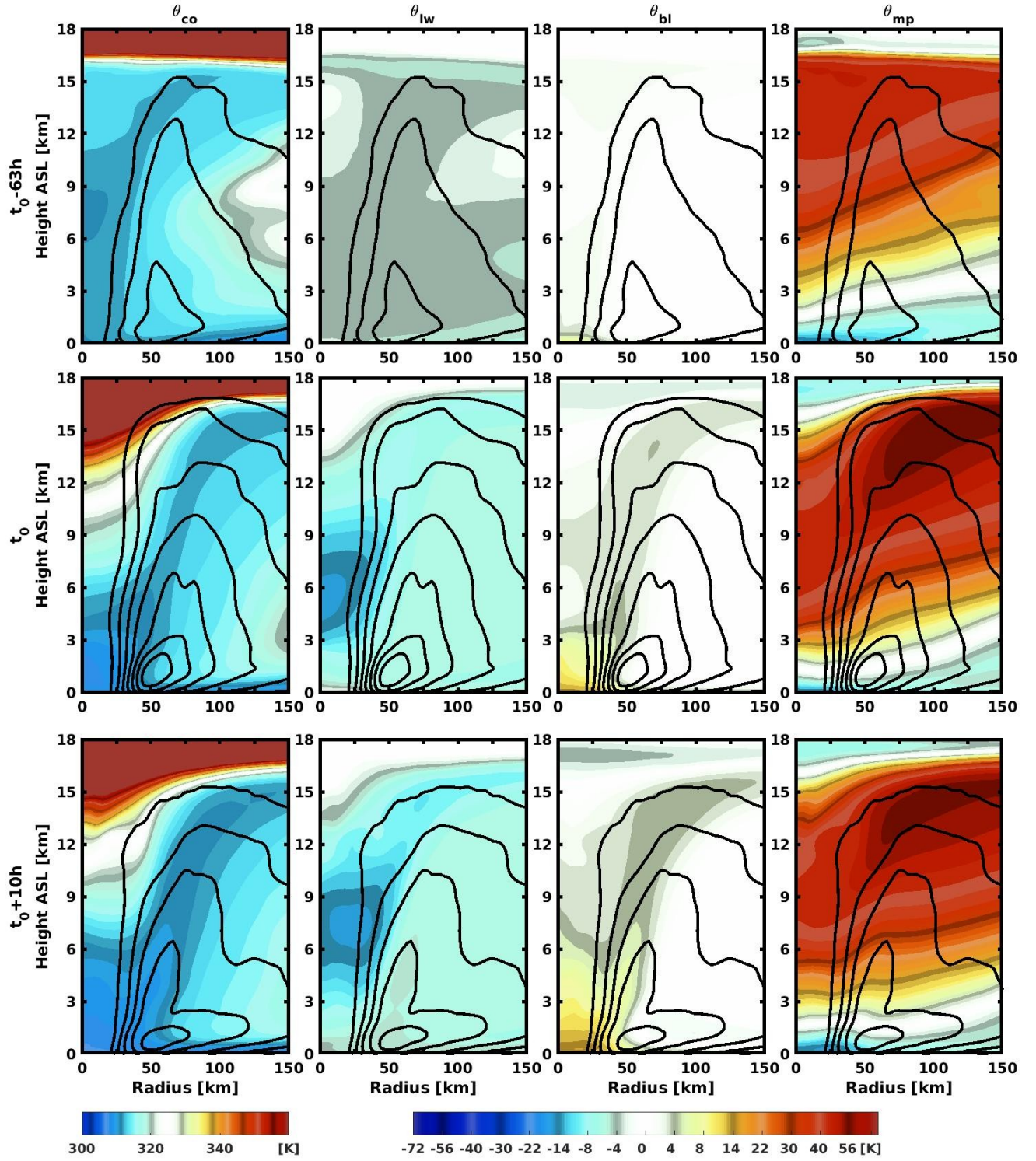


Fig. S9 As in Fig. 8 of the article showing vertical-radial distribution of the azimuthal mean θ tracers (columns) for three different times (rows). Black contours show azimuthal mean tangential wind speed (every 10 m s^{-1} , starting from 20 m s^{-1}). Fields of θ_{sw} are comparably small and thus are not shown.