Figure S1. Zonal mean CH$_4$ mixing ratios from MIPAS, TM3, TM5-4DVAR and LMDz-PYVAR (left) and model biases (model - measurement) (right) during June 2011.
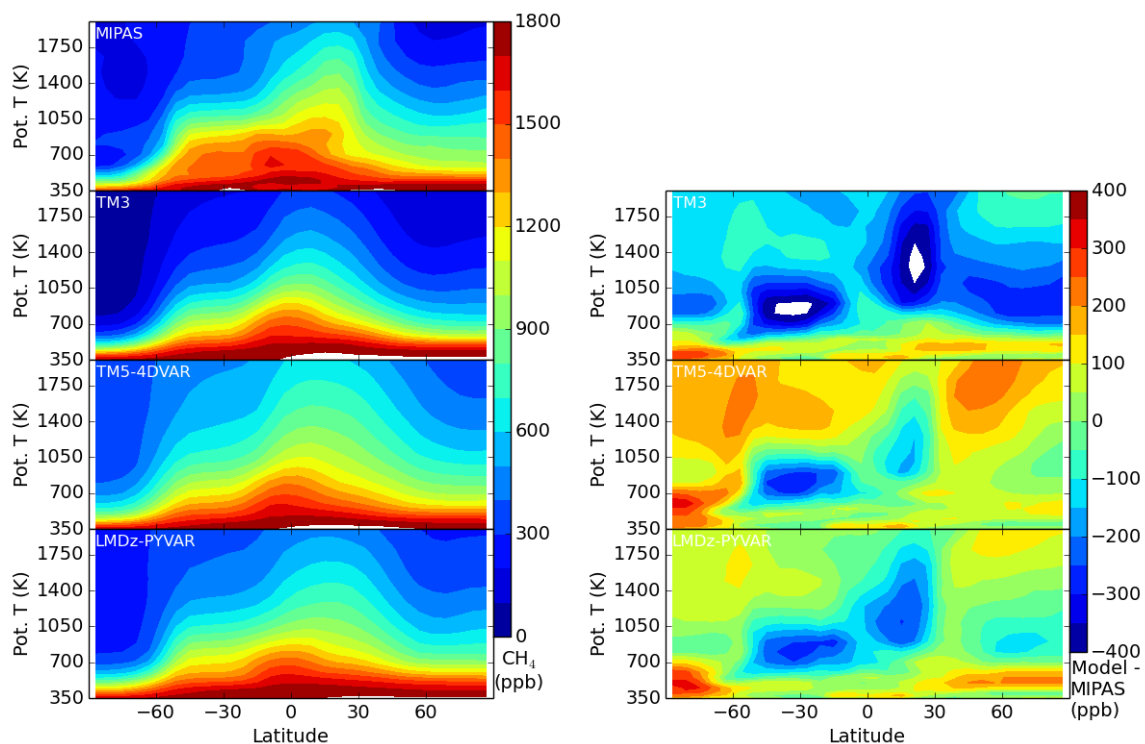
Figure S2. Same as Fig. S1 but for August 2011.
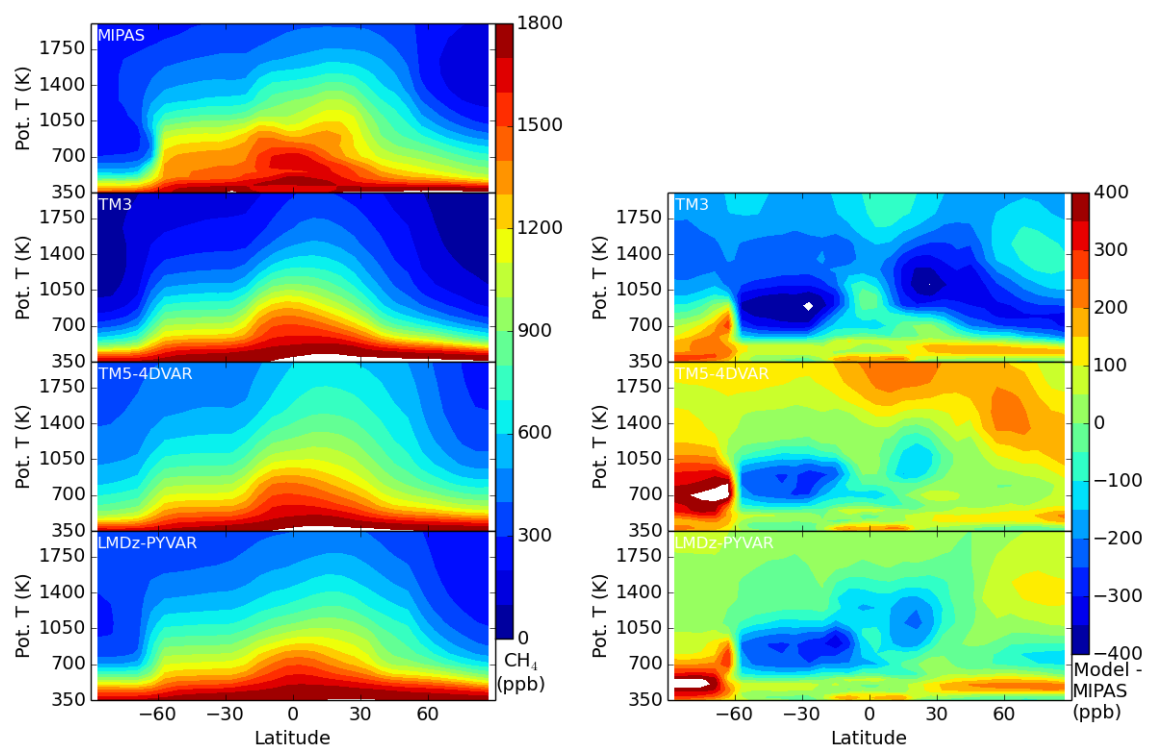
Figure S3. Same as Fig. S1 but for October 2011.
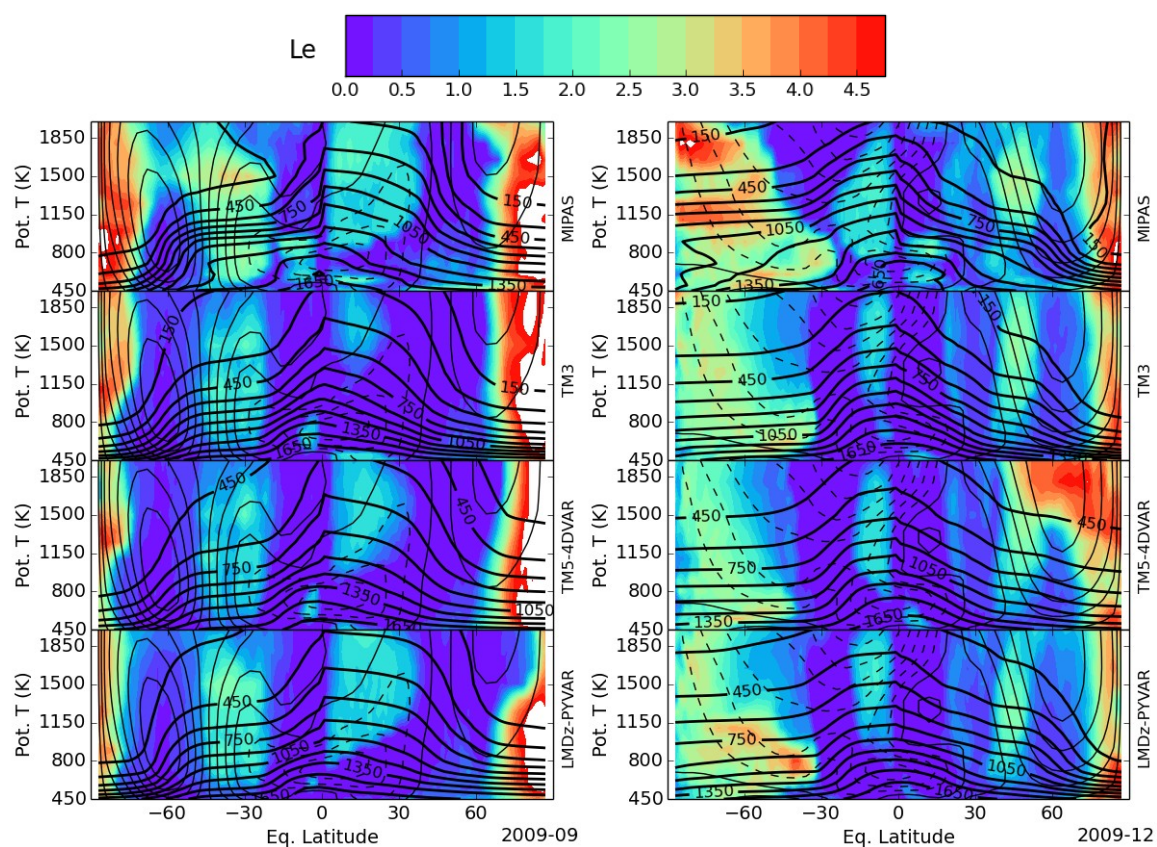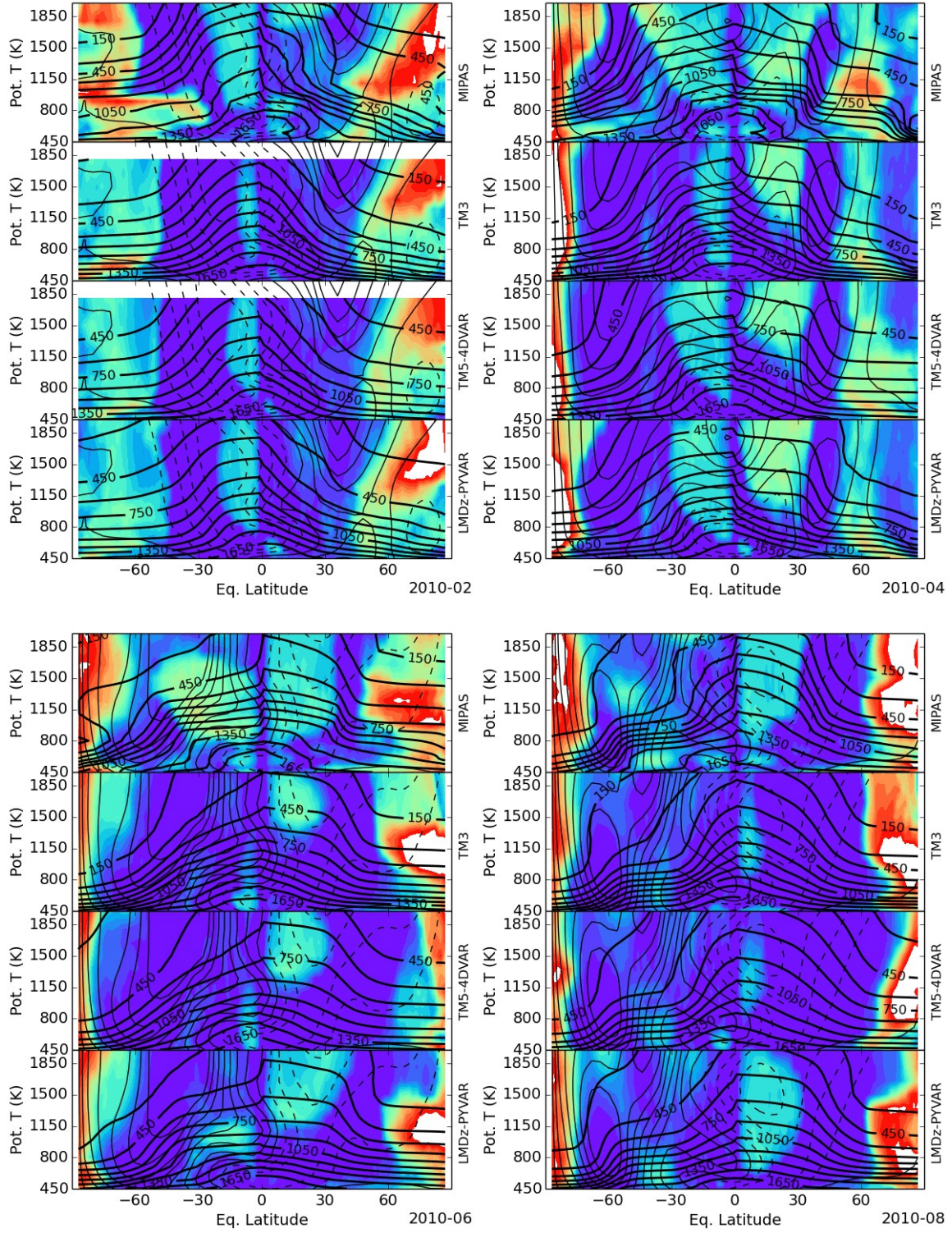
Figure S4. Distributions of L_e, equivalent length (colors, the white means no data or larger values), CH_4 mixing ratios (thick black line with increment of 150 ppb) and zonal mean zonal wind (thin

black lines with solid for westerlies and zero values and dashed lines for easterlies, the increment is 10 m/s) along equivalent latitudes (but latitudes for wind) and potential temperatures. Results for MIPAS (upper panel) and TM3, TM5-4DVAR and LMDz-PYVAR (lower panels) are shown between October 2009 and August 2010 every other month.