

Global Distribution of CO₂ in Mid Troposphere from the Atmospheric Infrared Sounder (AIRS) Measurements Suggests Greater Cross Equator Exchange

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The Atmospheric Infrared Sounder (AIRS) enables us to monitor the global distribution and transport of middle tropospheric CO₂ over oceans, land and the poles (Chahine et al., 2008). Mid tropospheric CO₂ retrieved by AIRS shows a substantial spatiotemporal variability that is supported by aircraft flash sampling measurements (Matsueda et al., 2002; Machida et al. 2008). These data can be used to constrain the cross equator exchange of CO₂. The uncertainties in the cross equator exchange of CO₂ affect the reliability of the estimations of the CO₂ sources and sinks in both hemispheres (Tans et al., 1990 and Fan et al., 1998). We use the Caltech/JPL 2-D chemistry and transport model (Shia et al., 2006) to simulate the mid troposphere CO₂. The model is used to calculate the cross equator transport of CO₂. Preliminary results indicate more inter-hemispheric transport than that implied by the ground-based data. Implications for CO₂ abundance and distribution in the southern hemisphere are discussed.

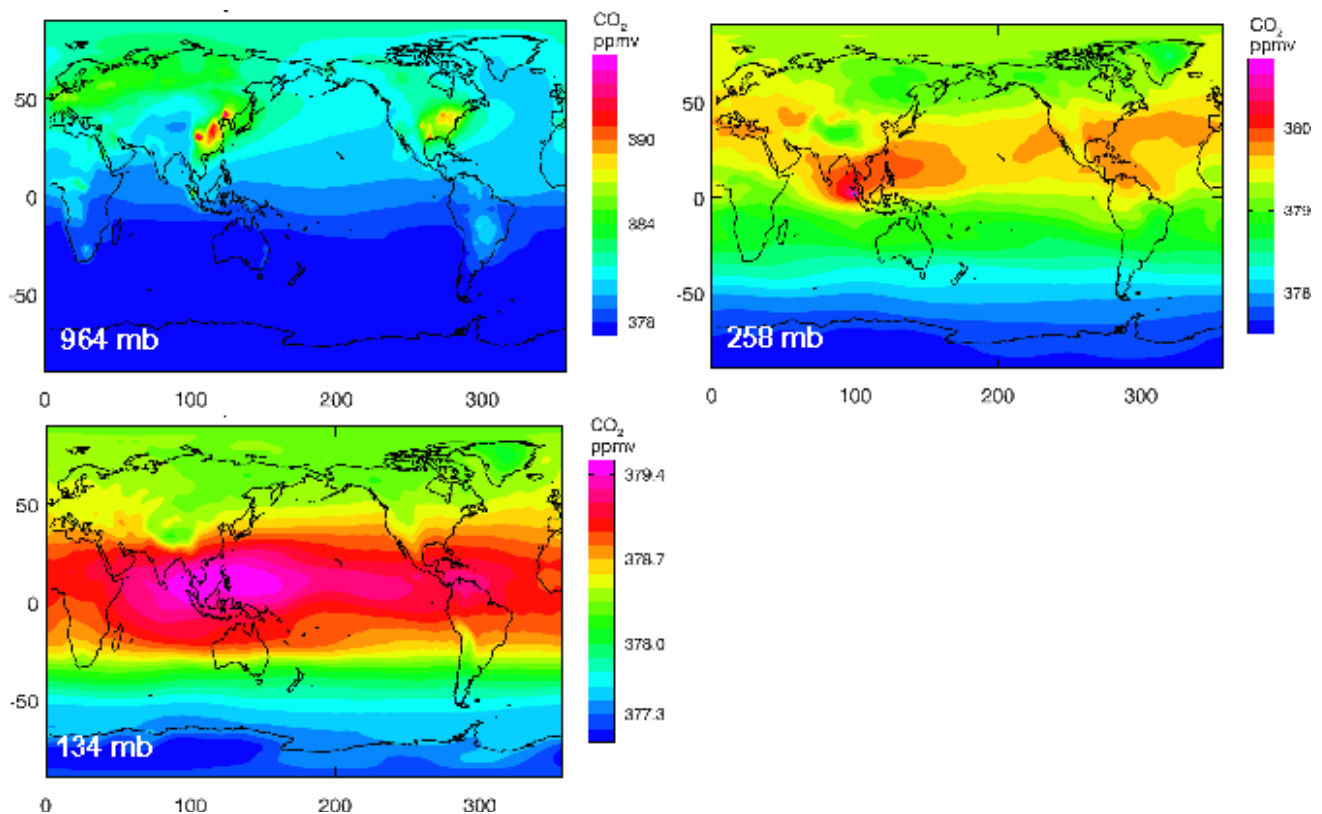


Figure 1. CO₂ distribution simulated from MOZART. Three levels (964mb, 258mb and 134mb) are shown.