

AAS001-11

会場: 201B

時間: 5月28日11:45-12:00

## 全球化学気候モデルを用いた対流圏水素濃度の再現：土壌吸収の与える影響

### Simulation of tropospheric molecular hydrogen using chemical GCM: impact of soil sink

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To reproduce temporal and spatial variations of atmospheric molecular hydrogen ( $H_2$ ), we made model simulations using a three-dimensional atmospheric global chemical transport model, CHASER. The model is coupled with land process model (MATSIRO) and improved dry deposition scheme, which includes the effect of both soil moisture and soil temperature, calculates  $H_2$  uptake by enzymes in soil. Model results are compared with aircraft observations of Tohoku University and surface observations of NOAA/ESRL ground stations network.

The model reproduced spatial distributions and seasonal variations of observations well. Simulated  $H_2$  concentrations showed large seasonal amplitudes on the continent surface of northern high latitudes, with the maximum and minimum in boreal spring and autumn, respectively. The mean  $H_2$  concentration was lowest in the boundary layer near Japan and increased with increasing height. The vertical gradients change seasonally and the model captured these characteristics. The global burden of  $H_2$  in the troposphere is 144 Tg and its overall lifetime in the troposphere is 1.9 years. Soil uptake is 58.7 Tg, with the contribution of 76% of total  $H_2$  sink. Our results agree well with the previous estimates for the budget term from bottom-up studies and model estimation, which constrained by  $H_2$  concentration and/or isotope ratio. The results show that not only soil moisture but also soil temperature plays an important role in the seasonal variation of soil uptake and  $H_2$  concentration at northern high latitudes.

キーワード: 陸域-大気相互作用, 物質循環, 土壌吸収, 全球大気化学輸送モデル

Keywords: Land Ecosystem - Atmosphere interaction, Material Cycle, Soil Sink, Chemical AGCM