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## The Origin of Tropospheric Air Masses and related transport processes infer from FTIR measurements and Model Simulations in Western Pacific Region and South America

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The Western Pacific Region has some of the highest sea surface temperatures in the world, described as the Tropical Warm Pool (TWP). It plays a major role in the troposphere-stratosphere exchange and, the chemical composition in the TWP will greatly affect that in the Tropical Tropopause Layer (TTL) and therefore the stratosphere. The FTIR station in Koror, Palau (7.5°N, 134°E) is the only FTIR site in the Warm Pool, which was installed as part of the EU-project StratoClim in 2016. The FTIR station in Paramaribo, Suriname (5.8°N, 55°W) was established as part of the EU-program STAR in 2004. The measurement site in Burgos, Philippines (18.5°N, 120.65°E) (Velazco et al., 2017a) just beside the Warm Pool was installed in 2016. Our analysis of FTIR methane measurements at Palau from 11/2018 – 06/2021 and at Suriname from 01/2017 – 05/2021 with the GEOS-Chem model simulations give some insights into transport processes and the origin of air mass in the TWP. The NDACC retrieved CH<sub>4</sub> has good sensitivity to the troposphere and stratosphere. Tropospheric and stratospheric X<sub>CH<sub>4</sub></sub> are analyzed separately based on the FTIR measurements. Simulations of CH<sub>4</sub> from the GEOS-Chem model are used to be compared with the measurements from two tropical sites. The position of the Chemical Equator (Hamilton et al., 2008) calculated from the GEOS-Chem model simulations and FLEXPART are used to investigate the seasonal variations of the CH<sub>4</sub> measurements from FTIR.