

## Investigating the tropical tropopause layer and the lower stratosphere using global models

\*Dmitry Belikov<sup>1</sup>, Fumio Hasebe<sup>1</sup>

1. Section of Earth System Science, Faculty of Environmental Earth Science, Hokkaido University

The tropical tropopause layer (TTL) is the transition region from the troposphere to the stratosphere, and acts as a gateway to the stratosphere. Understanding all processes that control the TTL, and incorporating them in models, is an important prerequisite for reliable predictions of changes in the TTL in a changing climate and for predicting how these changes in turn feedback, e.g., via stratospheric ozone chemistry, on the global climate system. Over the past two decades, large efforts have been undertaken to improve data coverage in the TTL with the necessary vertical, spatial, and temporal resolution required to accurately characterize the transitional character of the TTL. However, due to a lack of global observations it is still not clear how the connection between the stratosphere and troposphere occurs and how it modulates the convective activity. The purpose of this research is to establish an integrated study of internal processes in the tropical tropopause layer and the lower stratosphere and to deepen understanding on atmospheric environmental change through systematic simulations and analysis of various tracers (i.e., <sup>222</sup>Rn, SF<sub>6</sub>, CO<sub>2</sub>, CH<sub>4</sub>, and others) and meteorological parameters (temperature, wind, water vapor and others). This study focuses on the age of air and gravitational separation in the stratosphere.

Keywords: the tropical tropopause layer, the lower stratosphere, the age of air