



SPARC Workshop SHARP2016

## **Effect of future increase in nitrous oxide on stratospheric ozone**

Dr. Stefanie Meul, Dr. Sophie Oberländer-Hayn, Ulrike Langematz

Freie Universität Berlin

stefanie.meul@met.fu-berlin.de

With the successful regulation of halogen containing ozone depleting substances (ODS) in the Montreal Protocol and its amendments, today nitrous oxide (N<sub>2</sub>O) is the most important ozone depleting species emitted by anthropogenic activity. The future increase of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) however, will have a mitigating effect on the ozone depleting potential (ODP) of N<sub>2</sub>O. Thus, the future ozone depletion due to N<sub>2</sub>O strongly depends on the emission scenarios of CO<sub>2</sub> and CH<sub>4</sub>.

In our study we aim to quantify the contribution from N<sub>2</sub>O to the ozone loss under the extreme RCP8.5 scenario at the end of the 21st century when the stratospheric halogen loading will have returned to pre-1980 levels. Based on the analysis of multi-year simulations with the chemistry-climate model EMAC we examine the impact of increasing N<sub>2</sub>O on ozone and the feedbacks with greenhouse gas (GHG) induced temperature and circulation changes as well as CH<sub>4</sub> induced changes in stratospheric chemistry. Thus, we aim to understand the future potential of N<sub>2</sub>O to harm the stratospheric ozone layer if N<sub>2</sub>O is not regulated like the halogen containing ODSs.