1. Course title
Stratospheric Dynamics and Chemistry

2. Course code
ATM362

3. Course status: optional

4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)

5. Recommended time/stage of studies for completion

6. Term/teaching period when the course will be offered

7. Scope of the course in credits

8. Teacher coordinating the course

9. Course learning outcomes

10. Course completion methods

11. Prerequisites

12. Recommended optional studies

13. Course content

14. Recommended and required literature

15. Activities and teaching methods in support of learning

16. Assessment practices and criteria, grading scale

17. Teaching language
8. Teacher coordinating the course
Prof. Alexey Karpechko (Finnish Meteorological Institute)

9. Course learning outcomes
After the course, the students will understand basics of stratospheric chemistry and dynamics as well as the role of the stratosphere in Earth's climate system.

10. Course completion methods
The course will consist of lectures, exercises, and a final examination. 70% lecture attendance is required.

11. Prerequisites
Basic knowledge of atmospheric dynamics, physics, and general circulation is assumed. However, the course may be useful also with a more general physical sciences background, for instance, for aerosol physics graduate and doctoral students.

12. Recommended optional studies
ATM306 Basics of atmospheric chemistry
ATM357 Atmospheric Radiation

13. Course content
The course familiarizes the students with the chemistry and dynamics of the stratosphere. The topics covered are as follows:

- Important chemical reaction chains in the stratosphere
- Radiative transfer and radiative heating in the stratosphere
- Theory of stratospheric ozone depletion
- Linear theory of planetary wave propagation
- General circulation of the stratosphere
- Interaction between waves and the mean flow
- Transport in the stratosphere
- Ozone and UV radiation

14. Recommended and required literature
The lectures are based on the material from the following books, as well as from selected scientific articles:


15. Activities and teaching methods in support of learning
There are weekly lectures and exercises.

16. Assessment practices and criteria, grading scale
The grading is based on the exercises (30%) and the final exam (70%).

17. Teaching language
English