Large scale ozone risk assessment for vegetation, from past years to the end of the century under different climate change scenarios

Background and motivation

Ozone is a secondary pollutant that can cause visible injuries to vegetation in general, but also relative growth reductions in forest plants and crop yield losses in agricultural species[1]. The phytotoxic ozone dose (POD) index seems the best suited for the estimation of the impact of stomatal ozone deposition under future climate. The project will be focused on modeling activities aimed at defining an integrated procedure based on meteo-chemical data, spatialization techniques and deposition models to produce regional scale maps for the ozone (O_3) risk assessment for vegetation in Europe.

The main goals of the project are:

• Calibrate and validate a model for the estimation of the phytotoxic ozone dose absorbed by vegetation (wheat and poplar will be used as reference receptors for crop and forest species, respectively) at $1km^2$ resolution in non-complex terrain.

• Provide O_3 risk assessment maps for vegetation based on future climate change scenarios in order to outline possible mitigation strategies for the O_3 impacts.

The candidate is expected to acquire the knowledge in the fields of environmental data elaboration, atmospheric pollutants deposition, plant physiology and soil water dynamics modelling, risk assessment.

The candidate is also expected to proactively carry out the research project, interacting with the research groups of the supervisors and with external groups working on similar subjects.

References

1. Emberson L., 2020. Effects of ozone on agriculture, forests and grasslands. Phil. Trans. R. Soc. A. 378: 20190327.

Profile

- Master's degree or comparable qualification in Mathematics, Physics, Biology, Environmental sciences or adjacent fields. The title must be obtained before October 31st 2021.
- Strong commitment, ability to work in a team, and eager for international mobility is required.
- A solid background in computer science, micrometeorology and ecology.
- Good knowledge of the English language, both spoken and written, is essential.
- Documented experience and skills in data analysis, geostatistics and programming (i.e. MATLAB and Visual Basic).

Opportunities

- Perform modelling research in an interdisciplinary research environment and actively participate to the international collaboration between research groups in Italy and in Belgium with the aim of achieving a PhD under the joint supervision by KU Leuven and UCSC, with at least one year spent in both institutions.
- Gain didactical experience by being involved in teaching duties for a limited amount of time (e.g., guiding Bachelor and Master students with their experiments and research).
- **Double degree opportunity.**

Supervisors

• Prof. Giacomo Gerosa UCSC, Italy, giacomo.gerosa@unicatt.it
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