Ministry of Human Resources and Social Security

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

2019 Helmholtz – OCPC – Program

for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: Monitoring of Aerosol Composition and Cloud Droplet Activation

Helmholtz Centre and institute:
Forschungszentrum Jülich, Institute of Energy and Climat Research, Troposphere (IEK-8)

Project leader: Prof. (adj.) Dr. Thomas Mentel

Web-address: http://www.fz-juelich.de/iek/iek-8/EN/

Description of the project :
Aerosols are important constituents of the atmosphere. Atmospheric aerosol particles are undergoing chemical and morphological changes during their tropospheric lifetime of a few days. Tropospheric aerosols play an important role for climate as they determine formation, lifetime, and optical properties of clouds. They contribute to air pollution and can cause severe health problems (e.g. cardio-vascular diseases). Despite their obvious importance, aerosols are the least understood component in the atmosphere and regional air quality models have difficulties to predict aerosol properties that are important for radiative balance, cloud formation, and health effects. The reasons are the diversity of aerosols sources, the ageing processes, and the medium long lifetime of aerosols, which causes overlapping transport and local processes.
In cooperation with a partner from the People's Republic of China we want to exploit long term monitoring of aerosols, covering the four seasons of the year. We will measure the particle size distribution, the particle composition by aerosol mass spectrometry (AMS) and the ability to act as nucleii for cloud droplet activation (CCN activity). The monitoring will be operated on the Meteorological Tower of the Research Center in Jülich in three different heights: at the ground, at 50m, and outside the surface layer at 120m. Comparing observations at three different heights allows for separating local and regional effects.
i) to determine particle sources and relate it to CCN-activity
ii) to understand chemical processing of atmospheric particles in relation to CCN activity
iii) to optimize the chemical weather forecast of the regional model EURAD.

Description of existing or sought Chinese collaboration partner institute:
We have a very successful collaboration with the College of Environmental Sciences and Engineering, Peking University, Beijing, regarding the CCN activity of processed aerosol particles. This fruitful cooperation led to several peer reviewed papers. Currently, we are working with our partners at PKU on relating sources and CCN activity of atmospheric particles by using one year of tower data. With the proposed project we want to extend this partnership. We are open for new groups who are active in the field tropospheric aerosols and the process of aerosol formation in context of air pollution and climate change. Interest

and experience in monitoring and evaluating data by aerosol mass spectrometry with respect to health issues or aerosol cloud interactions would add extra value.

Required qualification of the post-doc:

- PhD in chemistry, physics or environmental science
- experience with CCN measurements, aerosol mass spectrometry
- additional skills in programming, data administration, working in teams

PART B

Documents to be provided by the post-doc, necessary for an application to OCPC via a postdoc-station in China, which is affiliated to a research institution like a university:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation
- Proof of command of English language

PART C

Additional requirements to be fulfilled by the post-doc:

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team