# UP 16: Andere Themen

Zeit: Donnerstag 16:45–17:30 Raum: GW2 B3009

UP 16.1 Do 16:45 GW2 B3009

**Artificial and Natural Radioisotopes as Environmental Tracers and Chronometers** — •Helmut Fischer — Institute of Environmental Physics, University of Bremen, Germany

Radioisotopes in the environment, artificial or natural, can pose serious hazards to living organisms and are therefore monitored with highly sensitive equipment. Investigations of environmental pathways are in many cases focused on the radiation dose in the endpoint organism, which is then compared to recommended or imposed limits. Such experimental and modelling studies are necessary for the assessment of effects caused by accidental or routine releases of radioisotopes into the environment, and also for the prediction of effects caused by planned installations like future nuclear waste repositories.

On the other hand, current radiometric methods are able to detect many radioisotopes, and in most environmental media, in concentrations orders of magnitude below a hazardous level. This opens up the possibility to follow these isotopes through many compartments of the ecosphere. This way radioisotopes can become valuable environmental tracers, independent of their radiological relevance, like natural $^{7}$Be in the atmosphere or medical $^{131}$I in rivers. Furthermore, application of the radioactive decay law offers the possibility for radiometric dating for a variety of isotopes beyond the well-known $^{14}$C, e.g. the established $^{210}$Pb/$^{137}$Cs and the experimental $^{32}$Si for sediments.

Examples will show environmental tracer and chronology applications of radioisotopes. The results can be of high relevance for non-radiological disciplines, e.g. climatology.

UP 16.2 Do 17:00 GW2 B3009

**Angular distribution of artificial light at night in Europe observed by VIIRS–DNB** — •Kai Pong Tong, Georg Heygster, and Justus Notholt — Institut für Umweltphysik, Universität Bremen, Bremen, Germany

Measuring angular distribution of upwelling artificial light is important in assessing the ecological impact because various creatures are negatively affected by particular patterns of artificial skyglow. We use the night time radiance data for clear nights without twilight and moonlight from the VIIRS–DNB sensor on board the satellite Suomi NPP to characterize the angular distributions of upwelling artificial light for Europe based on the data of the whole year 2015. We find that for most of the 74 major cities and metropolitan areas, the emissions are higher near the horizon. The mean numbers of overflights, which varied between 1 and 19, means that there are on average less than two overflights per month, potentially affecting the robustness of the analysis. Future analysis may consider using moonlight models to compensate for the retrieval of moonlit scenes in order to improve the statistics.

UP 16.3 Do 17:15 GW2 B3009

**Influence of varying opening angle and spectral bandwidth on bidirectional reflectance factors** — •Christine Pohl[1], Larysa Istomina[1], Evelyn Jäkel[2], and Georg Heygster[1] — [1]Institute of Environmental Physics, University of Bremen — [2]Institute of Meteorology, University of Leipzig

The albedo of snow covered Arctic ice plays an important role for the Arctic amplification of the global warming. To derive the albedo from observations, the distribution of bidirectional reflectance factors (BRFs) are measured by airborne or satellite instruments which offer amongst others different fields of view (FOVs) and different spectral bandwidths. The diversity in these sensor specifications introduces an uncertainty in the comparison of ground truth and satellite and airborne BRFs, respectively, and accordingly in the derivation of the albedo. The influence of different FOVs and different spectral bandwidths on the BRF are analyzed. Snow BRFs are simulated by the radiative transfer model SCIATRAN in a standard Arctic atmosphere at 75°N under a solar zenith angle of 55°. The dependence of the BRF on the FOV and on the spectral bandwidth of the sensor will be presented, respectively, and will allow to estimate the errors of the different observation techniques.