



EUNADICS-AV tracer experiment releases: Modelling and model evaluation

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Aviation is one of the most critical modes of transport in this century. Even short disruptions of flight schedules result in major economic damages as was proven by the aftermath of the 2010 Eyjafjallajökull-eruption in Iceland. Air traffic safety is another important aspect. The focus of the ongoing project EUNADICS-AV (European Natural Airborne Disaster Information and Coordination System for Aviation) is on developing methods and systems which guarantee a safe air traffic and at the same time low economic damages in case of a possible natural hazard or a possible nuclear accident.

In September 2018 an experiment took place in Germany and Austria in order to simulate a real emergency situation. Small amounts (5 to 10 kilograms) of a non-toxic, inert tracer gas (Perfluorcarbon-PFC) were released in Oberpfaffenhofen/Germany and Langenlebarn/Austria into the atmosphere to be transported by the wind. As the natural background concentrations of the tracer gas are very low, only small amounts needed to be released. Altogether three planes with specific measurement devices, i.e. a Learjet commissioned by DLR, a PC6 from the Austrian Federal Armed Forces and a DA42 from the University Düsseldorf were flying through assumed regions affected by the dispersed tracer gas to measure its distribution.

The areas assumed to be affected by the tracer plumes were predicted with the atmospheric transport and dispersion models FLEXPART and HYSPLIT, both based on the very same high-resolution ECMWF-input. Because the tracer was released at the surface, correctly representing, respectively parameterizing, the mixing layer was of crucial importance. As will be demonstrated for one tracer release mixing seems to have been depicted quite differently in the two atmospheric transport and dispersion models. Given a pronounced vertical wind shear this resulted in quite diverse modeling results.

The aim of this presentation is to compare FLEXPART and HYSPLIT qualitatively for one of the tracer releases and to evaluate FLEXPART based on the measurements.