



WegenerNet: A new climate station network in Eastern Styria/Austria for monitoring weather and climate at 1 km-scale resolution

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The region Feldbach in Eastern Styria, Austria, has been selected by the WegCenter/Univ. of Graz as a focus area for a pioneering weather and climate observation experiment at very high resolution: The WegenerNet climate station network region Feldbach (in brief WegenerNet) is comprised of 151 weather stations, which measure temperature, humidity, precipitation, and other parameters, with high accuracy in a tightly spaced grid (approx. one station per 2 km²; ~1.4 km x 1.4 km grid within an ~20 km x 15 km area centered near the City of Feldbach at 46.93°N, 15.90°E). Within the “Pilot Project WegenerNet” (Oct 2005–Dec 2007) the WegenerNet infrastructure was set up, mainly in 2006, starting to deliver data in the fall of 2006 and providing regular measurements with 5-min sampling from the entire grid since 1 Jan 2007, in near-real time from GPRS/Internet-attached data loggers. 2007 was the first year (“pilot year”) of operation and a first version of an automatic quality control system and a web-based data portal were implemented and completed by Dec 2007. In 2008 the network demonstration phase is carried out, with completing the quality control system by inter-parameter, inter-station, and external reference capabilities, rendering the data&information portal fully bi-lingual (German, English), and advancing weather and climate data product development, respectively. Full operational service is foreseen to be reached by Jan 2009, from which on the WegenerNet is scheduled as a long-term field experiment in support of climate research at the 1–10 km scale. Adding further value, the WegenerNet meteorological observations are complemented

by lightning measurements in cooperation with the Inst. of Physics/Univ. of Munich (European LiNet network, including dedicated stations in Feldbach and Graz) as well as by hailpad measurements (as of the hail season 2008). In addition, a 3D-steerable Doppler weather radar (of the Styrian Hail Protection Society at Übelbach/Reicherhöhe near Graz; surveying cone south-eastwards) is available with unobscured view of clouds and rain over the WegenerNet area, focusing its measurements on hail and heavy rainfall.

Many research projects investigating climate and environmental change and their impact, as well as local weather (extremes), will benefit from WegenerNet data covering the local scales from 1–10 km. This is a key domain for future high-resolution climate modeling and analysis, currently mainly covering the 10–50 km scale, for meeting the needs of climate impact models and studies in heterogenous orography such as the Alpine region. Possible applications include validation of non-hydrostatic climate models (NHCMs) operated at 1–10 km resolution for dynamical downscaling, validation of statistical climate downscaling techniques, in particular of precipitation, validation of weather radar rain rate estimates, validation of spaceborne high-resolution remote sensing data, study of orography-local climate relationships, basin-scale and local water balance assessments, and many others.

The presentation will provide an overview of the WegenerNet along the lines above, introducing the network setup, characteristics, and capabilities and discussing its climate and weather research value. On-line access to the data portal, for visualization and data download, will also be demonstrated (www.wegcenter.at/wegenernet, www.wegenernet.org).