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# An integrated approach for high-reslution environmental impact assessment

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Rapid progress in observational technologies, satellite remote sensing, meteorological and air quality models opens an opportunity to address concrete needs of local stakeholders providing integrated scenarios of high-resolution environmental impact assessment. Such an integrated approach addressing both large and small scales, modeling and mapping might better connect the rigid, silo-structured organization structures responsible for the local environmental management. The TRAKT team has investigated three essential components of the approach: (A) citizen observations and data fusion; (B) satellite remote sensing; (C) high-resolution meso- and micro-scale meteorological modeling. The approach is demonstrated in a case study for the northern mid-size city of Apatity (Murmansk region, Russia). The demonstration case was based upon a realistic influential scenario for wintertime atmospheric conditions. We used the UHIARC meteorological observations, MODIS remote sensing data and SMEAR-I data sets taken during December, 26, 2017. The integrated approach involved the open access satellite data (digital elevation model ASTER, Open Street Map, surface type maps, AURA air quality data) and the downscaling chain with EC EARTH, Enviro-HIRLAM, COSMO-CLM models forced by ERA-Interrim and ERA-5 reanalyses. At the urban scale end of the chain, we integrated the large-eddy simulation model PALM. The study convinces that the technologies are sufficiently mature to collect and to fuse local data into a high-resolution data sets to extend a modeling downscaling chain down to a turbulence-resolving model. Quantitative information obtained from such a detailed scenario simulation is a valuable instrument for responsible decision-making by concrete users. Serving the user needs with high-resolution data and modeling distinguishes the proposed approach from a more common and better developed integrated approach applied to the regional-scale data and processes.