



Contribution ID: 19

Type: **not specified**

Spatial correction of low-cost sensors observations for fusion of air quality measurements

Tuesday, 14 September 2021 17:05 (20 minutes)

The context is the statistical fusion of air quality measurements coming from different monitoring networks. The first one of fixed sensors of high quality, the reference network, and the second one of micro-sensors of less quality. Pollution maps are obtained from the correction of numerical model outputs using the measurements from the monitoring stations of air quality networks. Increasing the density of sensors would then improve the quality of the reconstructed map. The recent availability of low-cost sensors in addition to reference station measurements makes it possible without prohibitive cost.

Usually, a geostatistical approach is used for the fusion of measurements but the first step is to correct micro-sensors measures thanks to those given by the reference sensors by prior offline fitting a model issued from a costly and sometimes impossible colocation period. We propose to complement these approaches by considering online spatial correction of micro-sensors performed simultaneously with data fusion. The basic idea is to use the reference network to correct the measures from network 2: the reference measurements are first estimated by kriging only the measurements of network 2; then the residuals of the estimation on network 1 are calculated; and finally, the correction to be applied to the micro-sensors is obtained by kriging these residuals. Then we can iterate or not this sequence of steps, and alternate or not the role of the networks during the iterations.

This algorithm is first introduced, then explored by simulation, and then applied to a real-world dataset.

Keywords

air quality; fusion; kriging; low-cost microsensors; spatial correction

Special/invited session

Primary author: Prof. POGGI, Jean-Michel (University Paris-Saclay)

Co-authors: BOBBIA, Michel (Atmo Normandie); Prof. PORTIER, Bruno (INSA Rouen Normandie)

Presenter: Prof. POGGI, Jean-Michel (University Paris-Saclay)

Session Classification: Mining

Track Classification: Mining