34. WebGIS Systems and Spatial Data Infrastructures for High-Resolution Temporal Analysis of Urban Air Quality: The UISH Project

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Urban air quality assessment needs resolutions that monitoring networks cannot provide, and downscaled fields whose local reliability must be demonstrated. This paper presents the geospatial architecture of the Urban Intelligence Science Hub for City Network (UISH) project for Catania, Italy, where a PostgreSQL/PostGIS geodatabase and a QGIS Server/Lizmap front end are used both as visualisation tools and as the control interface of asynchronous computation. The portal is publicly accessible at https://uish.ifac.cnr.it. Two years of hourly fields for NO2, O3, SO2, PM10 and PM2.5, downscaled from the Copernicus CAMS European air-quality analyses, are compared against the ARPA Sicilia network over 160,539 valid pairs. Model evaluation is configured as data: metrics, thresholds, scaling functions and expert weights are database rows. At background sites the normalised mean bias of the four species measured at more than one site lies between −28 % and +3 % with positive efficiency; at traffic sites NO2 is underestimated by 56–57 % and efficiency turns negative, while the correlation varies far less. The platform is then set against the European and Italian rules for spatial data infrastructures and Urban Digital Twins (INSPIRE, the High-Value Datasets regime and national open-data obligations), separating the requirements it already meets from those still to be demonstrated.