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Intercomparison trial on groundwater sampling

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Data quality within the framework of environmental monitoring programs is a major issue for reliable decision-making. Intercomparison is a very useful quality control tool but is rarely available for sampling operations, especially for groundwater.

This intercomparison trial on groundwater sampling has been organized by BRGM as part of Aquaref (French Reference Laboratory) programs. The aim is to assess the impact of the practices of 10 sampling teams on the monitoring results of around 120 parameters on a given groundwater-sampling site. Compared to a similar trial organized in 2009, this trial focused mainly on the risks of contamination on “emerging” pollutants results. Moreover, the trial addressed qualitative (sampling practices) and quantitative (dispersion of results) evaluation.

The depths chosen by the participants for sampling in the borehole complied with normative requirements. However, for one participant, the significant bias observed for some parameters are probably linked to this insufficient sampling depths and therefore to the lack of representativeness of the sampled water. The results of the on-site measurements showed (mainly for pH, conductivity and O₂) low dispersions close to the dispersions observed in the context of intercomparison tests for which the measurements are carried out under laboratory conditions.

Among the organic pollutants that were not found in any of the samples of the participants, it is important to note the absence of some substances for which risks of sampling contamination could exist as for example most PAH, perfluorinated, phthalates compounds. For these substances, the practices and materials of the participants were of sufficient quality not to contaminate the samples (at regulatory levels of analytical quantification limits).

At the opposite, contaminations of varying intensities were observed for 4-nonylphenol, ethylbenzene, xylene, toluene, diisobutylphthalate, Zn, Cu ... For BTEX, four participants are concerned and contaminations could be linked to gasoline used for generator. For other identified compounds, contaminations are rare and generally only affect one participant.

Despite this, these compounds and more broadly their families must remain points of attention both for sampler teams (substances to be considered in priority for quality control) and for data managers and users (regarding risks of false positives results). Such interlaboratory comparison showed its interest in assessing data quality and in contributing to the improvement of monitoring practices.