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COMETE project Valensole: lavender and water quality - spatiotemporal characterization of impacts to waters of agricultural pollution

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The Valensole plateau (Alpes de Haute-Provence, France) is formed of heterogeneous alluvial deposits in which numerous but relatively small aquifers are found. About a third of the drinking water wells supplying the surrounding area have been shut down due to a large contamination of groundwater by 2,6-dichlorobenzamide (BAM), a metabolite of 2 active substances (dichlobenil, chlothiamid) previously used on the area. This molecule is related to the lavender production, which is the main agricultural practice on the plateau. Most of these wells were defined in local management action plan as priority groundwater well.

In this context, the COMETE project aims at better understanding the hydrogeology of the area and by the way to assess pesticide transfer to groundwater. This project includes also the identification of measures involving farmers with a common objective of groundwater quality recovery. A continuous hydrodynamic and physicochemical monitoring network has been set up for 9 priority wells and springs. Groundwater dating campaigns using CFC/SF6 on 10 selected points have been carried out, as well as a large spatial analysis of groundwater chemistry and pesticides and some metabolites content on 70 wells and springs all over the plateau during the sampling campaign (June 2014). Permeability tests were also conducted on soils in order to establish a vulnerability map of the groundwater resource. Besides, investigations were conducted with farmers to trace the history of agricultural practices.

All these results were brought together to build up a hydrodeological conceptual model of the aquifer and to delineate the impluvium of the priority drinking groundwater well. Analyses of pesticides showed that 12 molecules (active substance or metabolite) were found among the 50 molecules that were looked for, some of them related to products that are now prohibited from sale (Bromacil, deethylatrazine, BAM), and others still authorized (Isoproturon, Fluazifop-p-butyl...). Finally, recommendations and priority actions to reduce the anthropogenic pressure leading to the pesticides contamination of groundwater were proposed for each catchment of the priority groundwater wells.