

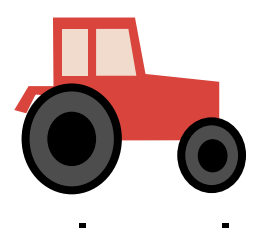
# Assessment of Trace Elements Distribution in French Agricultural Soils


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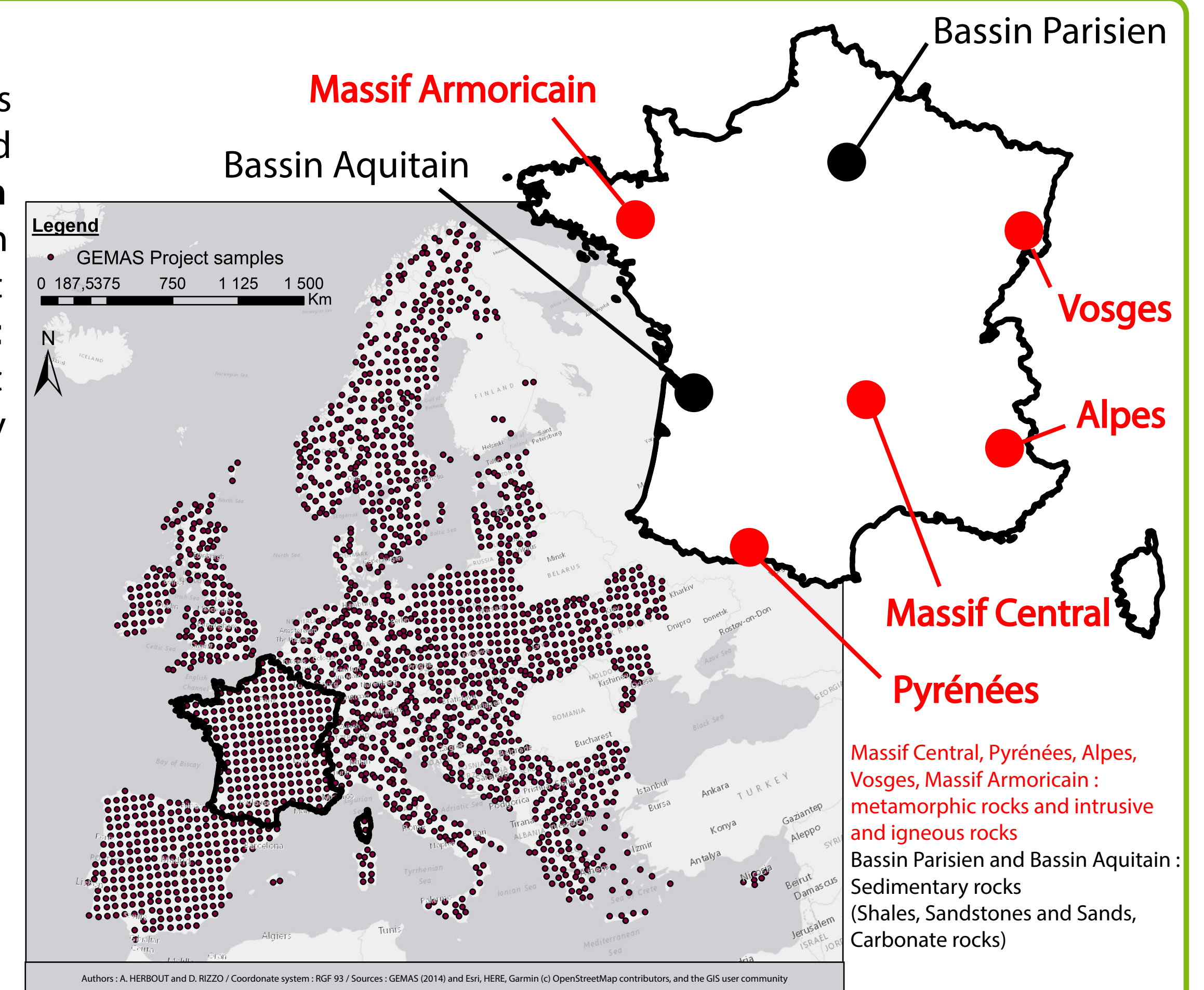
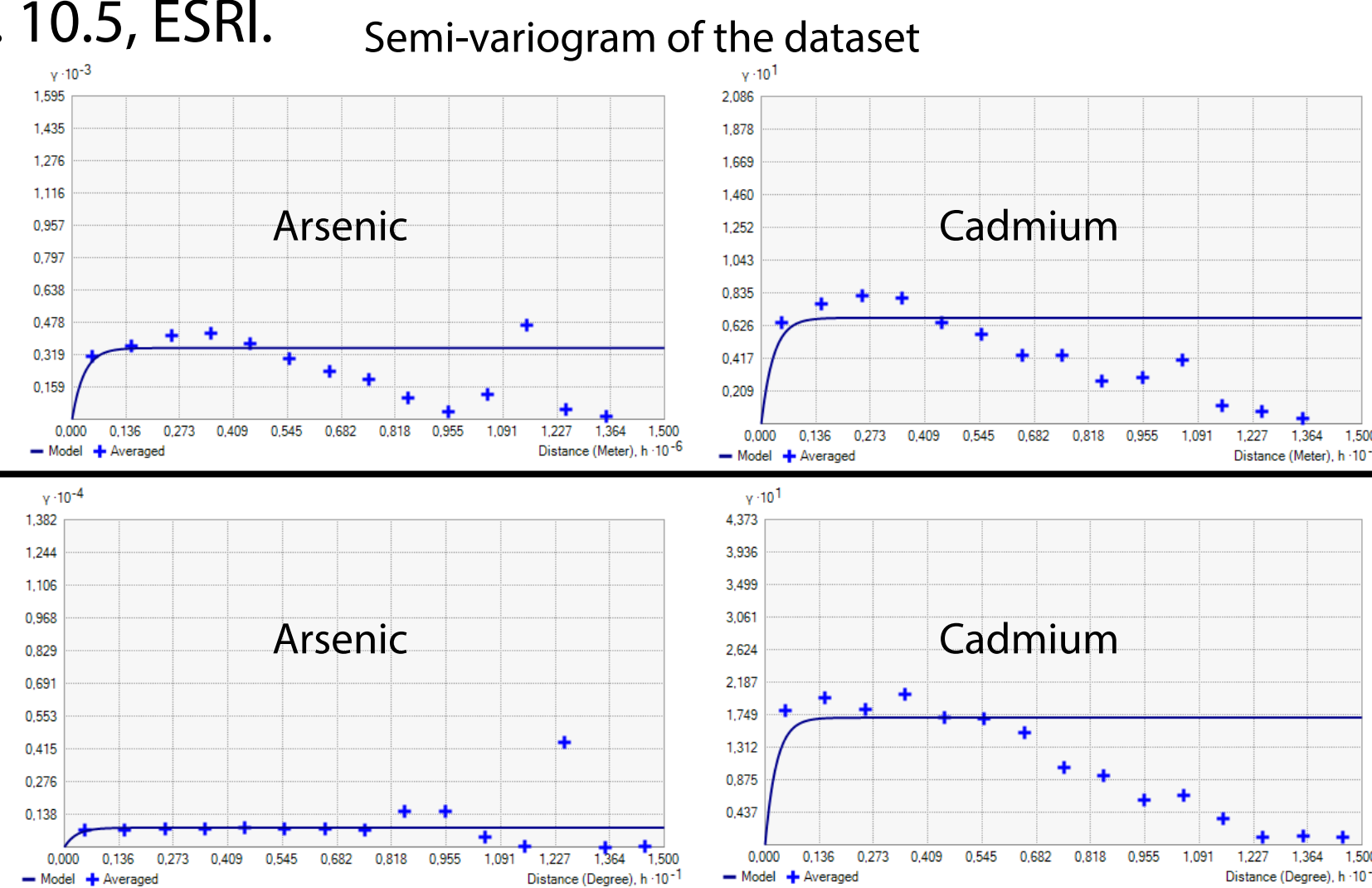
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## A first study of GEMAS dataset for France

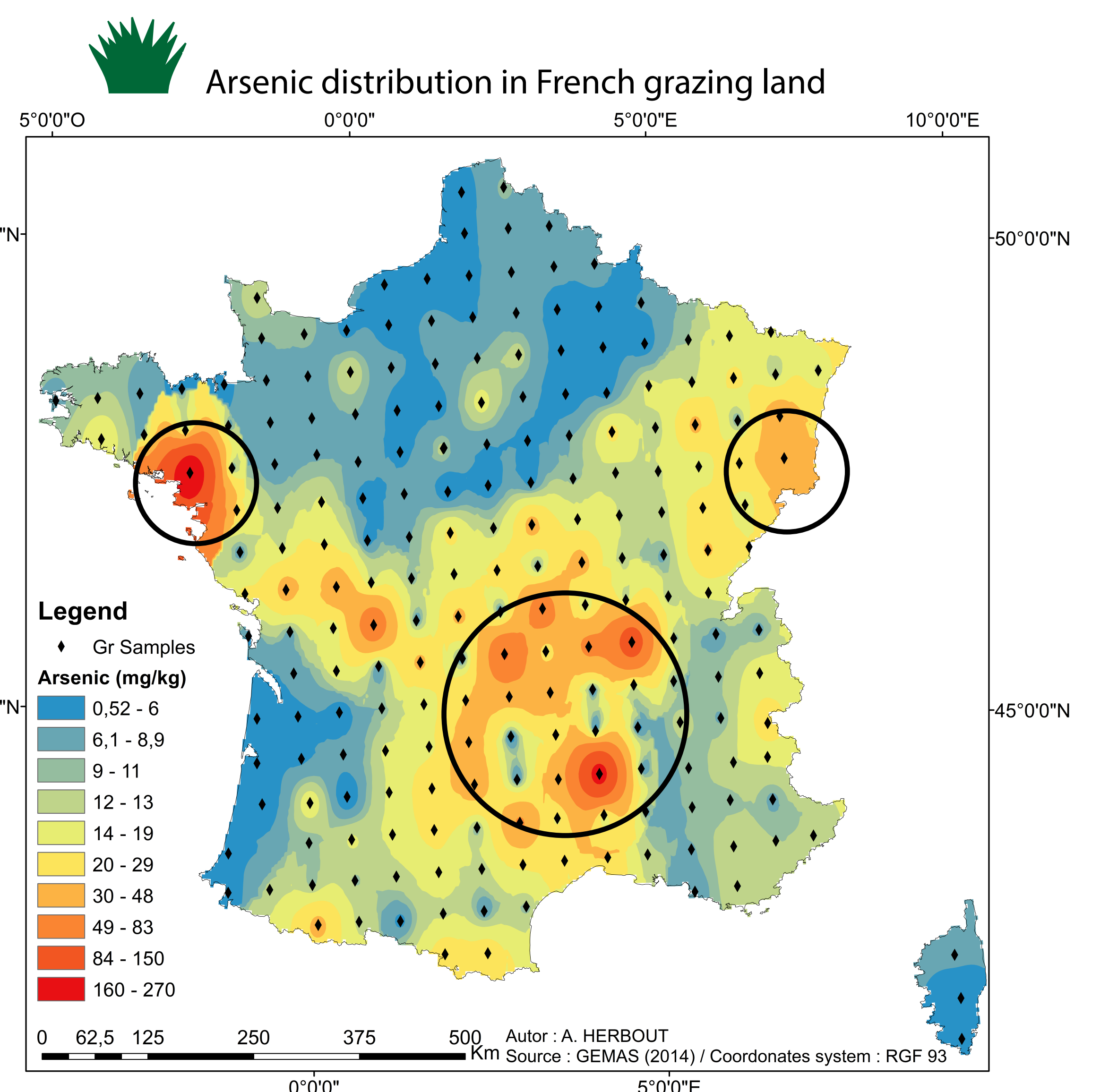
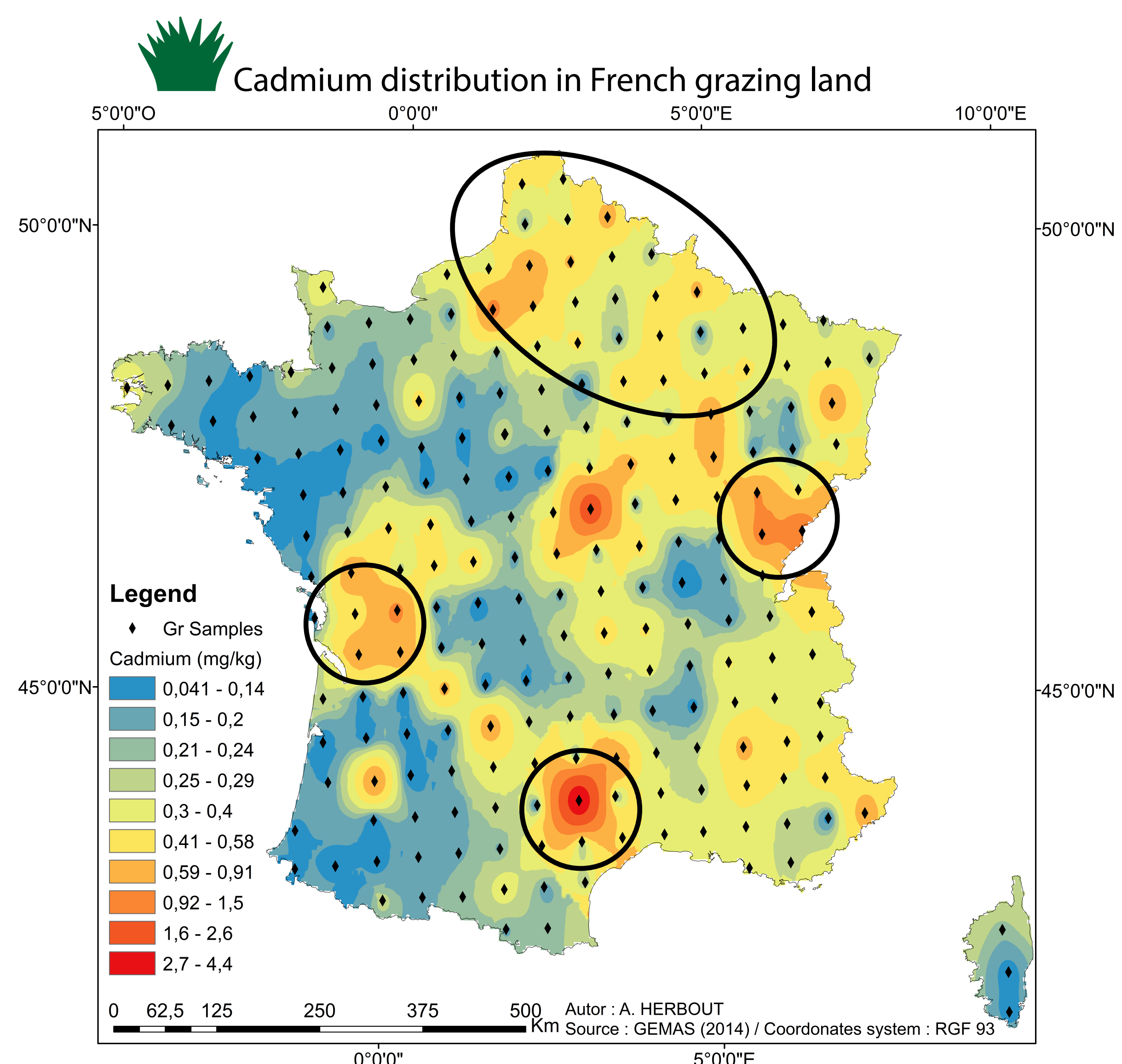
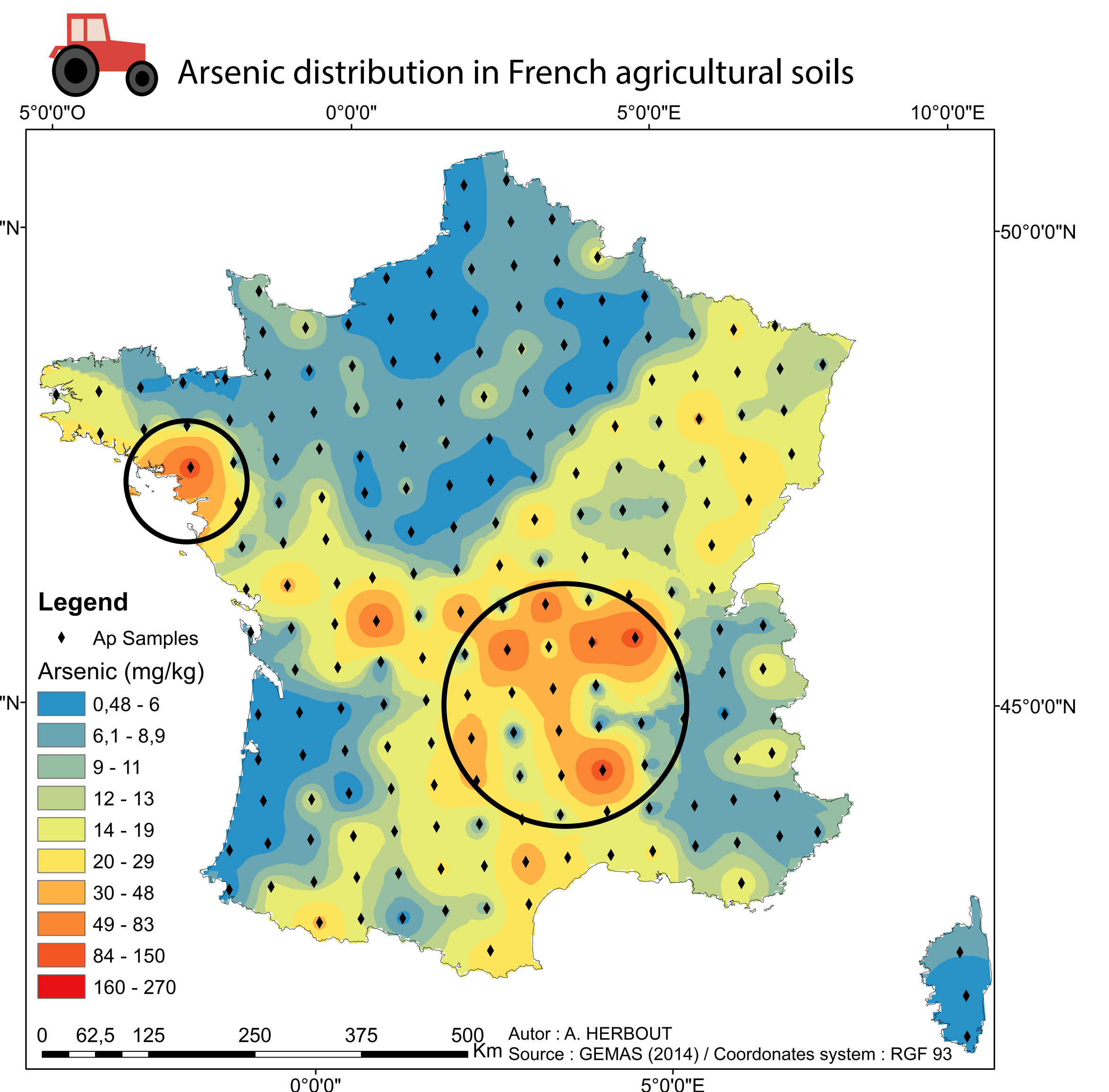
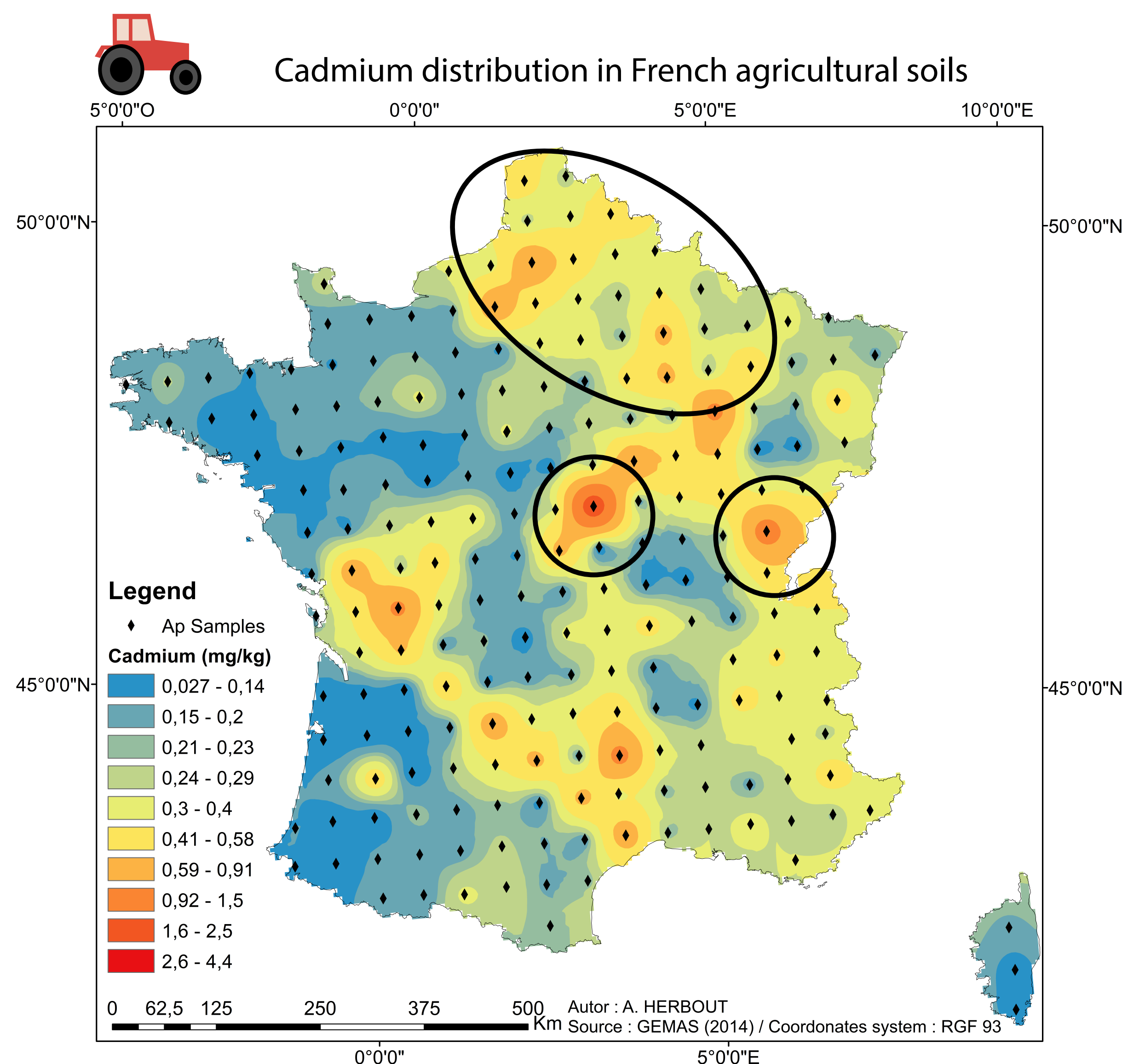
Input dataset comes from the GEMAS project [1]. These data were already used to study the distribution of trace elements for whole Europe. There are 2 types of data : agricultural soils (Ap samples) and grazing land (Gr samples). This kind of study doesn't exist in France. We present here a **first focus for France, with the aim to set possible guidance on thresholds**, based on the spatial distribution for these soil pollutants. The distribution of these elements was compared with French geology, divided into 5 main classes : (i) shales, (ii) sandstones and sands, (iii) carbonate rocks, (iv) metamorphic rocks and (v) intrusive and igneous rocks. As, Bi, Cd, Cu, Ni, Pb, Pd, Sb and Zn were selected due to their **enrichment factor higher than 40** in most of the five rock classes, more specifically **As and Cd**. Early results suggest that anthropic activities could have a relevant role in agricultural soils and grazing land soils. This study of the distribution used Ordinary Kriging Interpolation with Geostatistical analyste, from ArcGis<sup>®</sup> v. 10.5, ESRI.


 Agricultural soils  
 N : 214 samples  
 Median Cadmium : 0.215 mg/kg  
 Arsenic : 9.04 mg/kg


 Grazing land  
 N : 218 samples  
 Median Cadmium : 0.249 mg/kg  
 Arsenic : 9.5 mg/kg



## Interpolation maps



## Highlights

The highest concentrations are indicated by black circles. The distribution of both elements isn't equal.

► Cadmium is most concentrated in Sedimentary basins (Parisien and Aquitaine), South Massif Central and South Vosges. We can say that concentrations are not correlated to geology but to anthropic activities [2], like agricultural practices. The lowest Cd concentrations can be used for a polluted reference.

► A correlation between Arsenic and geology is seen in the South of Massif Central [3]. The concentrations of As in grazing land and agricultural soils depend on the bedrocks. As concentration is correlated with geology, because it depends of the bedrocks. The high concentrations of As are situated on igneous and intrusive rocks and metamorphic rocks. Depending of the bedrocks, As concentrations can be used as a reference for pollution in France.