Natural background levels (NBL) of groundwater, are defined as the concentration of a given element, species or chemical substance present in solution of a groundwater body which is derived by natural processes from geological, biological or atmospheric sources. Substances need to be understood in the context of their geochemical setting. This may often be difficult where substances exhibit high NBL in relation to any presumed anthropogenic component (Hart and Müller, 2006).

Due to the particular geological and hydrogeological setting, described above, the presence of many natural elements (i.e. As, F, V, Mn, Fe) and compounds dissolved in groundwater is widely documented, sometimes and somewhere exceeding the law thresholds, due to the volcanic and mineral nature of soils and hydrothermal activity. At the same time it is important to consider that some elements, naturally contained in soils, may be also mobilized by pollution phenomena, by changing in physical and chemical conditions (Temperature, pH, etc.) so their concentrations in groundwater may have also significant, local, not natural increase. Anyway background levels in groundwater are the result of water–rock interaction, chemical and biological processes both in the vadose and saturated zone, relationships with other water bodies, atmosphere and rainfall composition. For this reason, spatial variability of background level of a substance present in solution in a specific groundwater body can be huge and a single value may be difficult to define (Preziosi et al. 2010).

In the Latium Region the only commissioned studies, right now, are related to specific evaluation of thresholds of NBL for water supply and for some important potentially contaminated sites (ISRA/ENEA 2010), and moreover there are several scientific publications by research institutes and universities (Vivona et al. 2007, Preziosi et al. 2010, 2012, 2014, Hynsby and Condesso De Melo, 2006). Table 1 collects the results of main studies that are useful to define NBL values in groundwater in the area of Rome. Values indicate that there are some elements exceeding law limits, such as Mn (metal), As (semimetal), and F (non-metal) and others having significative concentrations such as V (metal) or B (semimetal).

Concluding, the lack of a general NBL aquifer zonation is a real problem related to the management of water supply and contaminated sites pressure. The best solution for the future NBL threshold evaluation should be to planning a study regarding the whole territory and every existing aquifer; by the way, looking at the existing studies, inside or close the territory of Rome (even if they have not been conducted analyzing the same species and with the same method), it can be shown which is the area with data gap that must be firstly investigated in order to obtain a first NBL diffusion in the territory of Roma Capitale. Many data about groundwater quality, which could be easily used for these purposes are currently available at the Regional Environment Protection Agency (ARPA Lazio) and other local government authorities. These data could be a useful support to a scientific hydrogeological study which should be a good opportunity for government authorities to work together in order to apply the best groundwater management practices.