

Evolution of Nitrate Concentration in Metro Natal Groundwater, Northeast Brazil

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The main objective of this work is demonstrating the state of advancement of the nitrate contamination in the groundwater of Natal and nearby cities. During recent years, excessive nitrate contents have been frequently reported in the tertiary-quaternary coastal Barreiras aquifer of Natal and nearby cities are based on recent data measured in 1995, 1997, 1998 and 1999 in order to determine the major factors in the nitrate migration and to identify the sectors sensitive to nitrate contamination. The nitrate concentration maps showed that the most sensitive zones to nitrate contamination are the north, east and central part of the Natal city. The nitrate concentration in these sectors exceeded 100 mg/l and those fixed by WHO. Thus, the groundwater of these sectors is unfit for human consumption. In these zones, the groundwater circulates in clay-sandstones layers characterized by a considerable permeability, porosity and is exploited at the depths between 20-60 m, under sand dunes. Some factors seem to be determining in the nitrate pollution of the groundwater such as: lithology, rainfall, nitrogen fertilizers, permeability of the aquifer and depth of the water table. The nitrogen isotope analysis ($\delta^{15}\text{N}$ between 7.8 and 13.8) indicated a contributing from human contamination. Comparing the chemical data from 1995 to 1999 presents a progressive and significant increase in the nitrate concentration.