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Groundwater aggressiveness as an important factor of engineering-geological conditions in the kazan city (Russia)

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Abstract

Many destructions appeared last decades in Kazan were caused by failure of underground communication systems and constructions. One of the basic approaches for proper and safe planning of the city development is estimation of the groundwater aggressiveness to underground constructions. A set of quantitative analytical data of groundwater compositions has been processed from more than 195 sampling sites. Chloride, sulfate and bicarbonate groundwater aggressivenesses were estimated and related with local physical properties of host soils and rocks. The results obtained were used for development of the groundwater aggressiveness map as a continuously-operating model. The sulphate aggressiveness dominating in the Kazan area (12%) and have natural genesis as well as the bicarbonate-alkaline (<1%area) and the carbon dioxide (10% area) aggressivenesses. Chloride aggressiveness is of exclusively anthropogenic genesis and its appearance depends on specific local conditions. The map can be used for preventing failures in aged underground constructions and for proper planning of new constructions in Kazan.

Keywords

Aggressive groundwater chemistry, Groundwater, Hydrochemistry, Hydrogeological mapping, Pollution, Underground construction, Urbanized area