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title: **The threat of groundwater resources in the Polish Baltic coast area**

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Salt and brackish waters occurring along the Baltic lowland in Poland originated by the sea water encroachment (intrusion) or by brines' ascension from deep Mesozoic strata (Dowgiałło, 1988; Kleczkowski, Nguyen-Manh-Ha, 1977; Zuber et al., 1990; Zuber, Grabczak 1991; Burzyński, Sadurski, 1990b, 1991; Burzyński et al., 2005). The recharge area of regional groundwater flow systems is the moraine plateau of the Lakeland where the land surface exceeds 200 m a.s.l. The fresh groundwater of 0.7 g/dm^3 in total mineralization was stated in Połczyn Spa at depth of 767 m in Jurassic aquifer. The values of $\delta^{18}O$ and δD where –9.25‰ and –62.5‰ respectively. The residence time of these waters, established by ^{14}C, was calculated as 5500 yrs (Krawiec 1999; Krawiec, Dulski, 2004).

The saline springs of total mineralization 34 g/dm^3 have been known in Kołobrzeg Spa since the VIIth century. The therapeutic salt waters exploited in: Kamień Pomorski Spa, Świnoujście Spa, Międzyzdroje Spa and Sopot Spa belong to the Cl^-–Na^+ hydrogeochemical type and are enriched in iodine and bromine compounds. The lowest values of $\delta^{18}O$ and δD up to –10‰ and –69‰ respectively were marked in water samples from Quaternary aquifers in this area (d'Obryn et al., 1997).

Groundwater flows in these aquifers were analysed using a mathematical model based on Boussinesq's equation. The equation resulting from adoption of the continuum hypothesis and the law of continuity and the momentum conservation law — Darcy's law, for steady-state flow conditions, is evaluated for a vertical, two dimension flow system (Burzyński, Sadurski, 1990a).

Noble gas temperature (NGT) and ^4He excess were measured in groundwater samples taken from drilled wells situated in the spas. Waters, that were supposed to be of Holocene ages, have NGT distinctly higher than the present mean air temperature (7°C) in this area. Results of the groundwater flow modelling suggest, that salt waters in the sluggish zone of circulation have different origins (Krawiec et al., 2000).

Clarification of the genesis of saline groundwater along the Polish Baltic coast is required for water resource protection and safe yield calculation of water intakes, including the salt water in the Spas.

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