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Late Pleistocene and Holocene Climatic Variability in the Carpathian-Balkan Region

ABSTRACTS VOLUME

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The atmospheric pollution in the area of the Goczałkowice Reservoir changes based on wet and dry deposition

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The Goczałkowice Reservoir was formed as a result of the accumulation of waters from the Vistula River caused by the construction of the earth dam of 2980 m in length between the town of Goczałkowice-Zdrój and Zabrzeg. It is located in Subcarpathia, near the Silesian Beskids mountain range (Outer Western Carpathians). Discussed reservoir was investigated in several environmental aspects. One of those researched elements was wet and dry pollution deposition in Integrated System Supporting Management and Protection of Water Reservoir (ZiZOZap).

The research on wet and dry pollution deposition was carried out at two measurement points situated on the opposite sides of the Goczałkowice Reservoir. From the east side it was a station in Goczałkowice and from the west side a station in Frelichów (fig. 1). The location of points allowed to assess influence of air masses from different directions and define sources of the pollutants.

Fig. 1 Localization of the measurement points in Goczałkowice and Frelichów

Moreover a meteorological monitoring was conducted at four points situated in the vicinity of the reservoir. On the basis of the research carried out in 2011-2013 it was concluded that the size of dry and wet deposition in the area of the Goczałkowice Reservoir is diversified both in particular years, seasons and months. Due to high precipitation and biological processes (activity of flora and fauna) the pollutant loads in the form of biogenic compounds (nitrogen and phosphorus) are the biggest in summer season. Whereas pollutant inputs in the form of dry

deposition are the biggest in winter season (heating season), which in case of a thick ice and snow cover in the spring time causes their accumulation and increased input into the reservoir water (thawing weather, snow-melt season). In relation to the 70s the size of the deposition became smaller, but in case of biogenic compounds it was diversified. A decrease was observed in case of total nitrogen but an increase in case of phosphorus (Fig. 2).

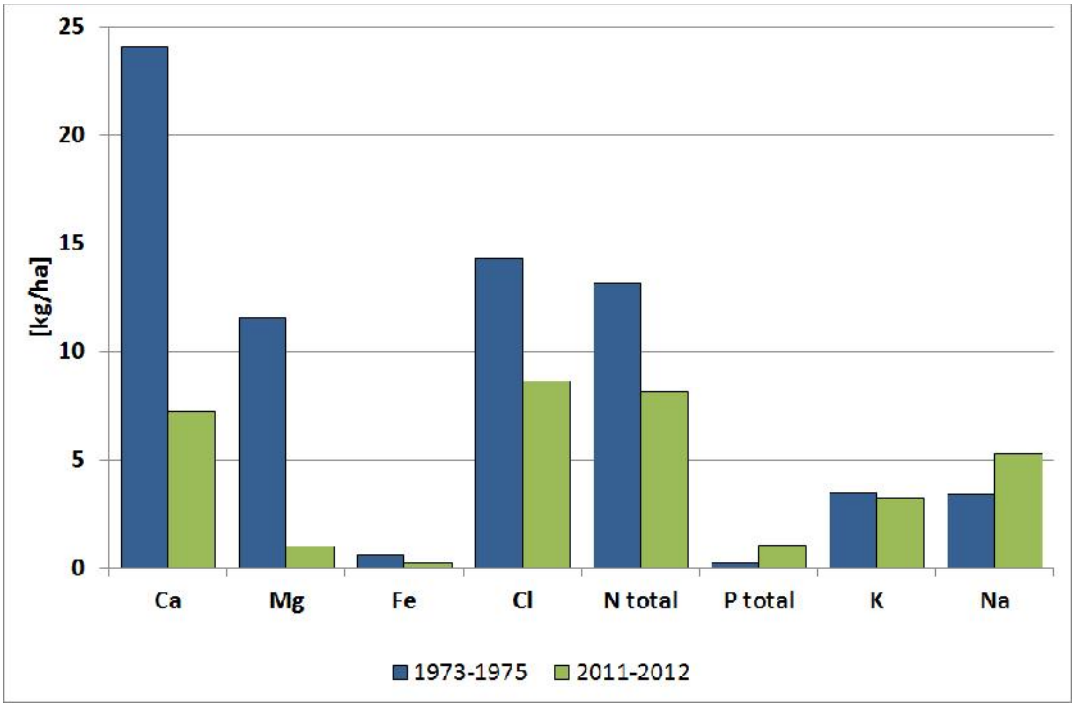

Fig. 2 Mean wet deposition values for Goczałkowice in 1973-1975 and 2011-2012 [kg/ha]

On the basis of comparison of the received results with the data provided by the Provincial Inspector for Environmental Protection and calculated for the annual area deposition of Pszczyna district in 2011 it appears that deposition of total nitrogen in the reservoir area slightly exceeds the area value. In case of total phosphorus in relation to the area data the deposition was over twice higher, what indicates that biogenic compounds are still a significant load of atmospheric deposition in the reservoir area. Therefore the atmospheric deposition, as well as the search for the methods of reducing the input of nitrogen and phosphorus compounds in the area of the reservoir (reduction of low pollutant emission), requires further monitoring. Comparison of mean values of the selected metals in the form of dry deposition which are currently taken in the region of the Goczałkowice Reservoir with their mean values from the beginning of the 21st century indicates a visible decreasing tendency. The observed decrease in the quantity of metals in the atmosphere is a reflection of changes taking place in the industrial structure of the area of Silesia, Podbeskidzie and Moravia.

Acknowledgements

The project used data from Integrated System Supporting Management and Protection of Water Reservoir (ZiZOZap).