CHANGES OF THE NUTRIENT LOADS OF THE Odra RIVER DURING THE LAST CENTURY - THEIR CAUSES AND CONSEQUENCES

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Nutrient emissions by point and diffuse sources and their loads were estimated for the Odra catchment over the time period of the last 50 years by means of the model MONERIS. For nitrogen a change of the total emissions from 38 kt·a⁻¹ N in the mid of 1950s to a maximum of 105 kt·a⁻¹ N in the early 1980s and a recent value of about 84 kt·a⁻¹ N were estimated for the total Odra Basin. The share of the point source discharges on the total N emissions varied between 24% (1955) and 35% (1995). The emissions from groundwater and tile drained areas represent the dominant pathway (37-56% of total N emissions) during all investigated time periods. Emissions from tile drained areas increased from the mid of 1950s to end of 1980s by a factor of 20 and reached in this period the same amount as emissions by groundwater. For phosphorus the emissions changed from 4 kt·a⁻¹ P in 1955 to 14 kt·a⁻¹ P in 1990 and a recent level of 7 kt·a⁻¹ P. Point source discharges caused between 36 to 66% of total P emissions and represent the dominant pathway for all investigated time periods. Erosion and discharges from paved urban areas and sewer systems was the dominant diffuse pathway of the total P emissions into the river system. The comparison of calculated and observed nutrient loads for the main monitoring stations along the Odra River shows that the average deviation is 12% for total phosphorus (1980-2000) and 15% for dissolved inorganic nitrogen (1960-2000). From the analysis it can be concluded that the present load of dissolved inorganic nitrogen (DIN) and total nitrogen (TN) of the Odra into the Baltic Sea is about 2.3 times higher than in the mid of 1960s. The maximum DIN load (1980s) was more than 3 times higher than in the 1960s. The change of the total phosphorus (TP) load is characterized by an increase from the 1955s to 1980 from 2 to 7 kt·a⁻¹ P (factor 2.6). Around 2000 the TP load was 4 kt·a⁻¹ which is only the double of the level of the 1955s.