Runoff to the Baltic Sea regions and total runoff

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Key message
During the last 4 years the total inflow has decreased from a top flow rate of more than 16000 to less than 11000 m$^3$/s in 2003. This is an extremely low runoff exceeded only in 1942, 1947 and 1976. The runoff during 2003 to the Bothnian Sea was the lowest since 1921.

The annual fresh water inflows to the Baltic Sea are 14200 m$^3$/s. During the period 1950 - 2003 total runoff to the Baltic Sea area show no long-term trends. On the other hand this time period is characterised by dry and wet periods lasting for a couple of years to a decade by and large following the NAO index. From a regional point of view the runoff enters the Gulf of Bothnia (6000 m$^3$/s), the Gulf of Finland and the Baltic Proper (3500 m$^3$/s) and to a lesser extent in Gulf of Riga and in Kattegat (1000 m$^3$/s) on average.

Results and Assessment
Runoff is a quantitative background indicator on the freshwater discharge, carrying the nutrients from the drainage areas to the coast.

Runoff is an important parameter on the change of pressure on nutrient supply due to varying climate and climate change. Also change in land-use can influence runoff. To evaluate the change of pressure on nutrient supply to the Baltic region it is necessary to know the variability of runoff and normalise for this natural variability.

The indicator shows the annual runoff from drainage areas but integrated over the Baltic sub-regions. Runoff is governed by the precipitation - evaporation on land areas and is also influenced by air temperature. It is the sum of direct river and diffusive runoff. In all sub-regions a strong seasonal, annual and decadal variability can be distinguished. Especially wet and dry periods are characterising the runoff. The 1970s were a fairly dry period compared with the 1980s and the later part of the 1990s. Geographically, the runoff is of about the same size in the Gulf of Bothnia, Gulf of Finland and the Baltic Proper, whereas the Gulf of Riga and the Kattegat contributes to a lesser extent to the total runoff.
Assessment

There is no obvious trend in the annual runoff during the last 50 years, neither in the total nor from sub-regions. The dry period found during the 1970s could have masked the marine eutrophication since the runoff was lower than average and hence also the total load of nutrients. During the wet periods the total nutrient load (pressure) increased making marine eutrophication (effects) even worse.

During the last 4 years runoff has fallen from a high to a very low annual value, which should lead to a slight increase in surface layer salinity and a lower nitrogen concentration in the Baltic Sea sub basins. The most dramatic decrease took place in the runoff to the Gulf of Bothnia and to the Gulf of Finland. A decrease in runoff only took place during 2003 in the Gulf of Riga and the Baltic Proper.

References


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