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Fifteen years of remote sensing and analyses of the Baltic Sea primary production (2005–2019)

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Present systems based on data recorded by satellites allow for the determination of many characteristics of seas and oceans, including the photosynthetic production of primary organic matter in the water column (PP). The SatBaltic system, launched in 2015, was used to determine PP in the Baltic Sea waters. This system provides daily maps of the spatial distribution of PP values and other characteristics of this sea. Relevant data can be found on the SatBaltic website (www.satbaltyk.pl). The collected extensive data bank allowed for the analysis of a number of processes occurring in the ecosystem of this sea. Photosynthetic primary production of organic matter was analyzed based on data from 2005–2019. Statistical analyzes of PP data available in the SatBaltic System allowed for a quantitative description of its variability in the entire Baltic Sea area. The average daily PP value for the entire Baltic Sea varied from approximately 5 mgC m⁻² day⁻¹ in winter (December and January) to over 700 mgC m⁻² day⁻¹ in July. The total annual PP value of the Baltic Sea in the analyzed period ranged within (37 to 45) * 10⁶ tC yr⁻¹. The obtained results indicate a slight increase in the productivity of the Baltic Sea over a period of 15 years. PP analyzes also showed significant differences between the productivity of individual reservoirs. In the East Gotland Basin, PP is 4% higher than in the Bornholm Basin, while in the Gdańsk Basin it is 33% higher.