

Pharmaceuticals are recognised as "emerging pollutants" in the environment due to its high use in the medicine and veterinary. Groundwater pollution originates from several location such as industrial effluents (e.g. manufacturing plants, hospitals, and food processing plants), municipal sewage treatment plants and combined sewage-storm-water overflows, resource extraction (mining), waste disposal sites (landfill sites, industrial impoundments, farm waste lagoons) and buried septic tanks. Therefore, groundwater has been enriched in pharmaceuticals worldwide. It has been also suggested that groundwater discharge can be an important source of pharmaceuticals in the marine environment. In the Bay of Puck several groundwater discharge impacted sites has been observed. Groundwater discharge has been responsible for significant flux of selected substances such as dissolved organic carbon (DOC). Pharmaceuticals are part of DOC, moreover their hydrophilic character and low redox conditions in discharged groundwater will decrease their sorption and increase persistence in discharged groundwater, respectively.

The research hypothesis assumes that coastal groundwater is enriched in pharmaceuticals residues and therefore groundwater discharge can be an important source of pharmaceuticals residues for the marine environment of the Bay of Puck while the main aim of the project is to calculate the pharmaceuticals residues fluxes via groundwater discharge to the Bay of Puck.

Proposed project is an interdisciplinary and complex project integrating the knowledge of different disciplines and levels. Project covers the route and processes of pharmaceuticals from coastal groundwater to the marine environment. The novelty of the project is using the concept of understanding the process influencing the occurrence and persistence of the pharmaceuticals residues. The factors such as oxygen changes, oxidation-reduction potential changes, concentration and speciation of organic matter and, finally, groundwater and seawater mixing (changes in ionic strength) will be tested. The proposed project will deliver not only a coherent knowledge on pharmaceuticals residues concentrations in groundwater wells used as a drinking supplies, rivers and coastal water of the Bay of Puck but also understanding of the pharmaceuticals residues influence on biota and process taking place in the sediment. The obtained results will verify if sediment can be an important sink and/or source of pharmaceutical to the marine environment and if the changes of population density influences the flux of the pharmaceutical to the environment. The great advantage of the project is that the obtained results could be extrapolated to others sites that characterize with similar physical and chemical parameters. The results of the project can be used by HELCOM and in the Baltic Sea models.