Metals and metalloids in offshore produced waters – impact on the marine environment

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Produced water (PW) is the water co-produced with oil and gas from oil wells and it represents the largest volume waste stream in oil and gas production operations on most offshore platforms. It contains both inorganic, e.g. heavy metals and radioactive material, and organic compounds in the form of dissolved and or dispersed oil. The purpose of the project is to map and quantify emissions of heavy metals and trace metals from offshore-based energy technology. In the context of oil extraction, large amounts of wastewater containing crude oil components, production chemicals, and metals from the subsurface are discharged. In the context of future use of oil reservoirs for CO2 storage or hydrogen storage in connection with power-to-X, water from the subsurface will be replaced by gas, and therefore also discharged. The release of alkanes from oil in the produced water is regulated in the OSPAR agreement, but metals in this wastewater are not currently subject to direct regulation and are often underreported. These, include the environmentally problematic metals copper, cadmium, lead, arsenic, tin, selenium, strontium, and mercury. The content of most of these metals is underreported, and even if they are found in low concentrations, they can still contribute significantly due to the large volume of water involved.