Sentinel-2 water indexes application for the underground water level analyses in Ovidiopol area of Odessa region (Ukraine).

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Problems statement and purpose. Studied area has a high level of agricultural development. There are different irrigation and drainage systems located there. Significant part of the supplied water losses from the irrigation network because of filtration and reaches the groundwater level, which begins to rise. Raising of groundwater level can lead to waterlogging of the soil, secondary salinization and, as a consequence, to a decrease in crop yields. As result, the groundwater level is under intense technogenic impact. Control and analyses of groundwater level changes with remote sensing methods for Ovidiopol area is the main goal of that work. The object of study is the groundwater level regime in the territory of Lower Dniester irrigation system in Ovidiopol district, Odessa region. The subject of research is water indexes application for analyses of groundwater level changes.

Data and methods. The local system of groundwater observation includes 7 drillholes in Nadlimanskoe village and around. These drillholes located in different geomorphological, hydrogeological and technogenic conditions. The groundwater level was surveyed monthly in 2017. Sentinel-2 2A images for each month from March 2017 to December 2017 were used for studied area. All satellite images has atmospheric correction. Three water indexes NDWI, MNDWI, NDPI were calculated for drillhole points for each month in 2017 year.

Results. Significant coefficients of correlation were obtained in comparison between groundwater level changes and water indexes in some drillholes points. The highest numbers of correlation connected with free of construction areas and for drillholes, which are located outside of villages. Water indexes have the same intra-annual dynamics of changing as groundwater level. NDWI is the most informative and representative index for studied area. Other types of indexes should be used for build-up areas analyses. However, existed water indexes can be used for groundwater level analyses in the open fields and in river slopes and valleys with developed irrigation system.