Geophysical Research Abstracts
Vol. 21, EGU2019-18746, 2019
EGU General Assembly 2019

Analysis of wastewater management scenarios for different rural settlement structures in Oman

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The most common approach to handle wastewater currently is centralized management. Achieving such an approach is costly due to long sewer network and pumping stations connecting the whole settlement, both of which comprise the greatest cost component in sanitary projects. Recent research has been concentrating on how to lower the costs through other management forms such as decentralization. Furthermore, centralized treatment plants are usually more economically efficient due to the economy of scale whereas decentralized solutions tend to be more flexible.
Although many highly populated areas in Oman and GCC countries are well developed, many rural areas are still lacking in terms of wastewater management.
A tool for the identification of the most suitable wastewater management and reuse scenarios called ALLOWS (Assessment of Local Lowest-Cost Wastewater Solutions) has been applied to different settlements in Oman. ALLOWS is a GIS-based analytical decision support tool including comparative cost analysis of different sewage management scenarios for preliminary sanitary planning.
ALLOWS is applied to three rural settlements in Oman, one in a mountainous setting, one in a coastal setting and one in a wadi setting. Using the three different settlement structures (e.g. topography, population/building density, building distribution, etc.), their impact on the ALLOWS scenarios results will be analyzed. Furthermore, for the costal setting the ALLOWS scenarios are calculated for the current situation and for a future development scenario. The results are important for decision making processes to identify the most suitable sewage management solution for rural area. The findings are based on data and analyses from Oman but can be easily applied to other GCC countries.