

Geosystem services – what is it and can it be useful for subsurface planning?

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Abstract

The subsurface is an important constituent of the physical environment. It provides physical space, water, energy, materials, habitats for ecosystems and acts as a repository for cultural heritage and geological history (e.g., van Ree & van Beukering, 2016). As such, the subsurface constitutes a multifunctional natural resource. However, awareness of the multifunctionality of the subsurface is generally low and is not a daily concern for decision-makers (e.g., van der Meulen et al., 2016). This often results in that decisions on access to subsurface resources are instead guided by a ‘first come, first served principle’, that can jeopardize sustainable development.

Though not fully developed, the concept of geosystem services (GS) has been put forward as a tool to make subsurface resources more visible and acknowledged in decision-making (e.g., van Ree & van Beukering, 2016). Currently there are two prominent definitions: (A) geosystem services are abiotic services that are the direct result of the planet’s geodiversity (Fox et al., 2020), independent of the interactions with biotic nature – there is no differentiation between suprasurface and subsurface features, and (B) geosystem services provide benefits specifically resulting from the subsurface (van Ree & van Beukering, 2016). Geosystem services as a concept has the potential to support the systematic inclusion of geosystem services in planning processes and contribute to improved subsurface planning (Lundin Frisk et al., 2022).

Creating thematic maps that show the distribution and potential conflicts of geosystem services can improve the knowledge of planners about the subsurface conditions and resources. Which, in turn, can increase the consideration of these aspects in early planning processes. As part of an ongoing exploratory study, we are developing (1) indicators for mapping of geosystem services in Sweden and (2) subsequent thematic information (e.g., maps) of different geosystem services. The thematic information will be tested in two municipalities with stakeholders (e.g., physical planners) to investigate what type of information is useful in spatial (2D and 3D) planning and in what format it should be presented to ensure that it is easy to read and interpret for stakeholders without prior expertise.

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