

The use of self-analogue information to investigate the long-term stability of the geological environment

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During the initial stage of the site selection process, NUMO will accumulate a database of all existing literatures on sites resulting from either volunteering or acceptance of Government proposal and will then need to interpret these in terms of the indicators of, in particular, site geological and hydrogeological stability. A critical issue is the amount of weighting that can be placed on indirect characteristics, which may present a contradictory picture in terms of simple interpretations. Note that this is very common in site databases; for example, some of the confusion caused by indications of rapid water flow (short-lived cosmogenic isotopes at depth), water table fluctuations (mineralogy of fracture filling minerals) *etc* at Yucca Mountain in the USA or the apparent evidence for oxidising groundwaters at depth (presence of Fe-oxyhydroxides) at Sellafield in the UK. Such interpretation can be greatly eased if comprehensive sets of such potential indicators can be measured at a similar (or analogous) site where much stronger stability arguments can be built up (*eg* owing to the persistence of geochemical anomalies).

The essence of this work is that the setting of the study should be as similar as possible to expected repository sites and best of all would be like the 'Regional (or Self) Analogue' of Nagra's former Wellenberg site in Switzerland. Here, the term has been coined to cover the use of data from similar geological settings to the repository site, which could be used to extend the information base on the site. The Self Analogue should tie evidence for stability (probably best focussed on hydrochemistry; for example, isotope hydrology in a form of palaeohydrogeological study) with other indicators that may exist in the potential site literature, such as data on groundwater chemistry as related to regional tectonic history.

Here, the overall approach will be clarified and the potential use of self-analogue information during the site selection process in Japan will be explained by means of international examples.