

Bureau de Recherches Géologiques et Minières (BRGM)

Decision support systems (DSS) for coastal vulnerability assesments

BRGM is involved in the development of DSSs related to coastal vulnerability, although the role of BRGM often focuses on partnership rather than direct implementation. BRGM utilizes GIS tools (e.g., ArcGIS, QGIS) and develop tools like climate services to support decision-making. France's DSS applications are integrated into projects such as Life Adapto+, INSEAPTION, CoCliCo, and PROTECT. Faced with the effects of climate change, the Life Adapto+ project deploys Nature-based Solutions for the flexible management of the coastal strip of 15 coastal sites. An operational version is expected in 2026 and a final version is expected by 2029. INSEAPTION, CoCliCo and PROTECT present interactive maps showing areas exposed to coastal erosion and sea-level rise.

Another output is in the form of an index expressing Vertical Land Motion (VLM) based on data from the Copernicus European Ground Motion Service (EGMS) (Thiéblemont et al., 2024).

Current research efforts include exploring Bayesian Networks and advancing methodologies to improve decision-support effectiveness (Bulteau et al., 2015; Rohmer & Le Cozannet, 2019; Rohmer, 2020).

Input parameters mentioned in the figure may comprise multiple sub-parameters. For more information on the input parameters see Larsen et al. (2025; Table 1, p 17).

Further reading

Bulteau, T., Baills, A., Petitjean, L., Garcin, M., Palanisamy, H., & Le Cozannet, G. (2015). Gaining insight into regional coastal changes on La Réunion island through a Bayesian data mining approach. *Geomorphology* (Amsterdam, Netherlands), 228(228), 134–146. <https://doi.org/10.1016/j.geomorph.2014.09.002>

Larsen, I. R., Ernsten, V. B., Maspataud, A., Dakin, N., van Heteren, S., Koutroulli, A., Poyiadji, E. & the GSEU T5.4 Consortium (2025). EGDl multifunctional 2D/3D decision-support module v1. GSEU Report on Deliverable 5.7, 165 pp.

Rohmer, J., & Le Cozannet, G. (2019). Dominance of the mean sea level in the high-percentile sea levels time evolution with respect to large-scale climate variability: A Bayesian statistical approach. *Environmental Research Letters*, 14(1), 14008–. <https://doi.org/10.1088/1748-9326/aaf0cd>

Rohmer, J. (2020). Uncertainties in conditional probability tables of discrete Bayesian Belief Networks: A comprehensive review. *Engineering Applications of Artificial Intelligence*, 88, 103384–. <https://doi.org/10.1016/j.engappai.2019.103384>

Thiéblemont, R., Le Cozannet, G., Nicholls, R. J., Rohmer, J., Wöppelmann, G., Raucoules, D., Michele, M., Toimil, A., & Lincke, D. (2024). Assessing current coastal subsidence at continental scale: Insights from Europe using the European Ground Motion Service. *Earth’s Future*, 12(8). <https://doi.org/10.1029/2024EF004523>

