Global possibilistic sea-level projections and their regional implications

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Goneri Le Cozannet (1), Gael Durand (2), Jean-Charles Manceau (1), Angélique Melet (3), Benoit Meyssignac (4), Catherine Ritz (2), Jeremy Rohmer (1), and David Salas-y-Mélia (5)

(1) BRGM, Risks and Prevention, Orleans, France (g.lecozannet@brgm.fr), (2) Institut des Géosciences de l'Environnement (IGE), 54 rue Molière - Domaine Universitaire - BP 96 - 38402 St Martin d'Hères Cedex, France, (3) Mercator, Parc Technologique du Canal, 8, Rue Hermès, 31520 Ramonville Saint Agne, France, (4) LEGOS - UMR 5566 | CNES - CNRS - IRD - UPS Toulouse III. 14, avenue Edouard Belin,Toulouse, France, (5) CNRM – UMR 3589, 42,avenue Gaspard Coriolis 31057 Toulouse Cedex 1 France, France

As climate changes, sea-level rise is aggravating coastal hazards such as flooding, coastal water salinization and shoreline changes. Current sea-level projections are provided in the form of median, likely and probabilistic products. They are essentially useful to plan optimum responses, in cases where the exposure and vulnerability is medium to low. However, the worlds' coastal zones include vital locations such as major cities, marine transportation and industrial centers, so that a failure in their adaptation planning may have foremost macro-economic and social implications. For these areas, there is a need for alternative types of sea-level projections, recognizing that not enough knowledge is available to represent each component of sea level rise through a single probability distribution. Here, we model each component of sea-level rise through possibility or probability distributions based on an extended review of the literature. Then, we perform a joint propagation of possibility and probability distributions (Baudrit et al., 2007). This allows to provide regional possibilistic sea-level projections compliant with the IPCC assessment and exploring high end scenarios. As expected, the results highlight that tropical regions are the most affected by the deep uncertainties affecting sea level projections. These projections can be combined with the knowledge available regarding vertical ground motions to estimate future coastal impacts and support adaptation planning in areas where risk acceptability is low.