Estimating sea-level allowances for Atlantic Canada under conditions of uncertain sea-level rise

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Abstract This paper documents the methodology of computing sea-level rise allowances for Atlantic Canada in the 21st century under conditions of uncertain sea-level rise. The sea-level rise allowances are defined as the amount by which an asset needs to be raised in order to maintain the same likelihood of future flooding events as that site has experienced in the recent past. The allowances are determined by combination of the statistics of present tides and storm surges (storm tides) and the regional projections of sea-level rise and associated uncertainty. Tide-gauge data for nine sites from the Canadian Atlantic coast are used to derive the scale parameters of present sea-level extremes using the Gumbel distribution function. The allowances in the 21st century, with respect to the year 1990, were computed for the Intergovernmental Panel on Climate Change (IPCC) A1FI emission scenario. For Atlantic Canada, the allowances are regionally variable and, for the period 1990–2050, range between –13 and 38 cm while, for the period 1990–2100, they range between 7 and 108 cm. The negative allowances in the northern Gulf of St. Lawrence region are caused by land uplift due to glacial isostatic adjustment (GIA).

Key words sea-level rise; allowances; IPCC; Atlantic Canada; tide gauge