

Determining heights in the new IGLD (2020)

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On behalf of the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data

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The International Great Lakes Datum (IGLD) is the vertical geodetic datum in which the measurement of water levels and determination of depths and flows throughout the Great Lakes region are being meaningfully and consistently related to each other for the management of water levels and flows. The IGLD is defined and maintained by the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data, a bi-national committee with representatives from the Governments of Canada and the United States. To ensure this datum provides accurate heights, it has been updated every 25-30 years to account for the effects of glacial isostatic adjustment (GIA) throughout the Great Lakes region. The first IGLD datum was IGLD (1955) which was later updated to IGLD (1985). These datums were defined by spirit levelling, an expensive method susceptible to accumulation of systematic errors. A new IGLD (2020), planned for release around 2027, is presently under development and will be based on a North American geoid that will also be used to define the new North American-Pacific Geopotential Datum of 2022 (NAPGD2022). Unlike previous datums, IGLD (2020) and NAPGD2022 will be primarily accessible using modern GNSS technology rather than levelling. A deformation model will also be used to account for the effects of GIA and other crustal motions. This will enable accurate measurements of water levels over many decades to support safe navigation, regulation of waters & flows, lake level forecasting, and other water resource management activities. We describe how the new datum is defined with a focus on how dynamic heights will be more efficiently and accurately determined using GNSS methods together with a crustal deformation model. We also describe plans for a major GNSS survey this year that will be used to integrate Great Lakes and St. Lawrence River water levels gauges into IGLD (2020).