



Samanburður á mælingum á sjávarborði og líkanreikningum með Delft3D-FM og greining á áhrifaþátta strandflóða. Kévin Dubois, Angel Ruiz-Angulo, Halldór Björnsson, Sigurður Sigurðarson og G.Orri Gröndal. Veðurstofan og Vegagerðin – mars 2022.

Ágrip skýrsluhöfunda:

Floods regularly cause damage and disruption to activities in ports or other coastal areas. A recent report noted 84 floods in the second half of the 20th century (Guðrún E. Jóhannsdóttir, 2017) but in an older summary it is stated that about 6 significant floods occur every decade (Páll Imsland and Þorleifur Einarsson, 1991). The frequency of those events and their possible increase under climate change suggest that it is important both to monitor the coastal sea level and to implement computational models to predict probable flooding.

Measurements of sea level have been carried out in several ports around Iceland. The measurements cover different lengths of time and are not overlapping everywhere. From those measurements, the data from seven ports have received particular attention, filling in some small gaps and also correcting the corresponding time shifts. For those stations, the revised data is currently available (Guðjón Scheving Tryggvason, 2016, 2017).

The Icelandic Meteorological Office has been working for some time on the installation of the coastal model Delft3D-FM (Deltares, 2020a, b) with the aim of being able to predict coastal floods. The numerical model solves the nonlinear shallow-water equations using finite volume elements in an unstructured mesh (about 150 m resolution along the coast).

The model is forced by astronomical tidal forces, winds and pressure fields. The air pressure and winds that the model uses as input data come from the Harmonie forecasting system of the Icelandic Meteorological Office. The model has already been used to simulate the water level for South-West of Iceland (cf. report March 2021) and compared with tide gauges measurements. The comparison was made both by calculating the tides in 6 stations for South-West of Iceland directly from the other tidal factors from the recent FES2014 system (Carrere et al. 2017) and using Delft3D-FM to calculate how the tidal wave reached the shore. The results of this comparison show that Delft3D-FM was better able to simulate the maximum sea level than FES2014, which demonstrates the importance of using a regional model to calculate tidal waves in detail. This comparison gives hopes that tides can be simulated elsewhere in the country, though comparison with the Reykjavík station is probably easier than with other stations as this station is the only IOC station in the country, and information from it stored in an international database such as those on which FES2014 is based.