Viscoelastic modeling results at the 79°N Glacier, Greenland
Where: Nioghalvfjerdsbrae (79°N Glacier)
GPS Stations at 79° North Glacier
What: Viscoelastic Maxwell Material

1D rheological model:

$$\sigma = \sigma_e + \sigma_v$$

$$\varepsilon = \varepsilon_e + \varepsilon_v$$
Modelled and observed displacements at certain GPS stations along a flow line.

1072 m

grounded ice sheet

GPS 5

136,5 km

grounding line

ice shelf

GPS 7

end of hinge zone

GPS 9

GPS 13
Results: Vertical Displacement

- pure tidal signal on the ice shelf
- effect of bending reduces modeled vertical displacements very similar to observed displacements in the hinge zone
- no tidal signal measured for grounded ice (smaller than noise), small tidal signal in model (~ 0.01m)

Note the varying y-axis!
Modelled Vertical Amplitude (semidiurnal)
Horizontal Displacement (grounded ice, model)

- amplitude decreases with increasing distance to grounding line
- phase shift increases with distance
Modelled Horizontal Amplitude (semdiurnal)

phase shift

bending