

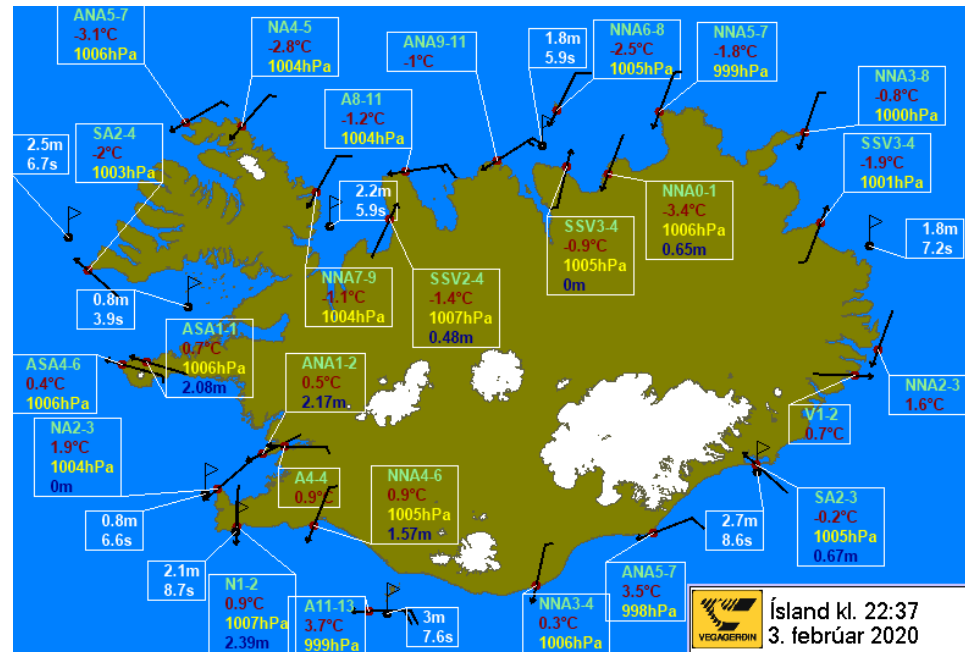


# National tidal observation network

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# Tidal observation network

- Experiences
- Further developments



## Veður og sjólag

- Weather and sea state (Veður og sjólag) – Information system for users at sea
- Established in the 1990'ies
- Aim:
  - Improve safety at sea
  - Aid navigation
  - Aid planning of work at sea and coast
  - Publish observations and predictions

## Veður og sjólag

- Includes information from a nation wide network of tidal gauges
- Electronic tide gauges
  - 1994-2000 (12): Hafnarfjörður, Grundartangi, Patreksfjörður, Dalvík, Hvanney, Vestmannaeyjar, Þorlákshöfn, Grindavík, Ólafsvík, Húsavík, Njarðvík, Sandgerði
  - 2000- present (5): Akranes, Skagatrönd, Reyðarfjörður, Höfn, Landeyjahöfn, ...

## Veður og sjólag

- Data from 13 harbours displayed on Veður og sjólag
- Tide prediction for 25 harbours
- Local harbour is owner and responsible for operating gauge
  - Support from IRCA

## Veður og sjólag

- Designed to inform about present and near future situation
- Collection of historical data in a database
  - „... On the web it is possible to look up past information by inserting date and time, decades back.“

# Historical data

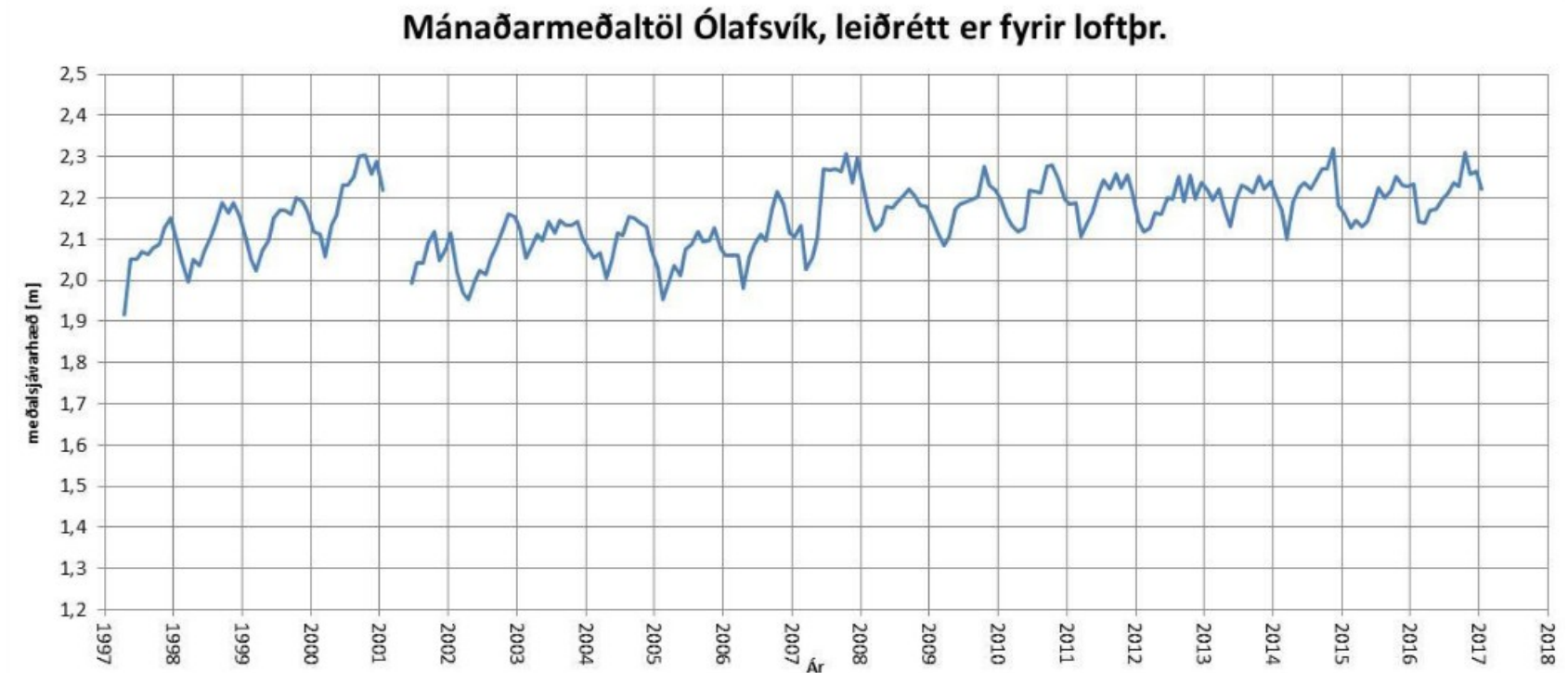
- Analysis of historical data
- Guðjón Scheving 2016 - 2017
  - Höfn í Hornafirði, Grindavík, Landeyjahöfn, Ólafsvík, Skagaströnd, Patreksfjörður, Reykjavík
    - Investigate data quality
    - Calculate astronomical tides parameters
    - Evaluate sealevel changes
    - Analyse extreme events and extrapolate return periods
- Matthías Á Jónsson ofl. 2017
  - Patreksfjörður og Reykjavík
    - Analyse extreme events, extrapolate return periods, calculate astronomical tide param

## Tide gauges experieces

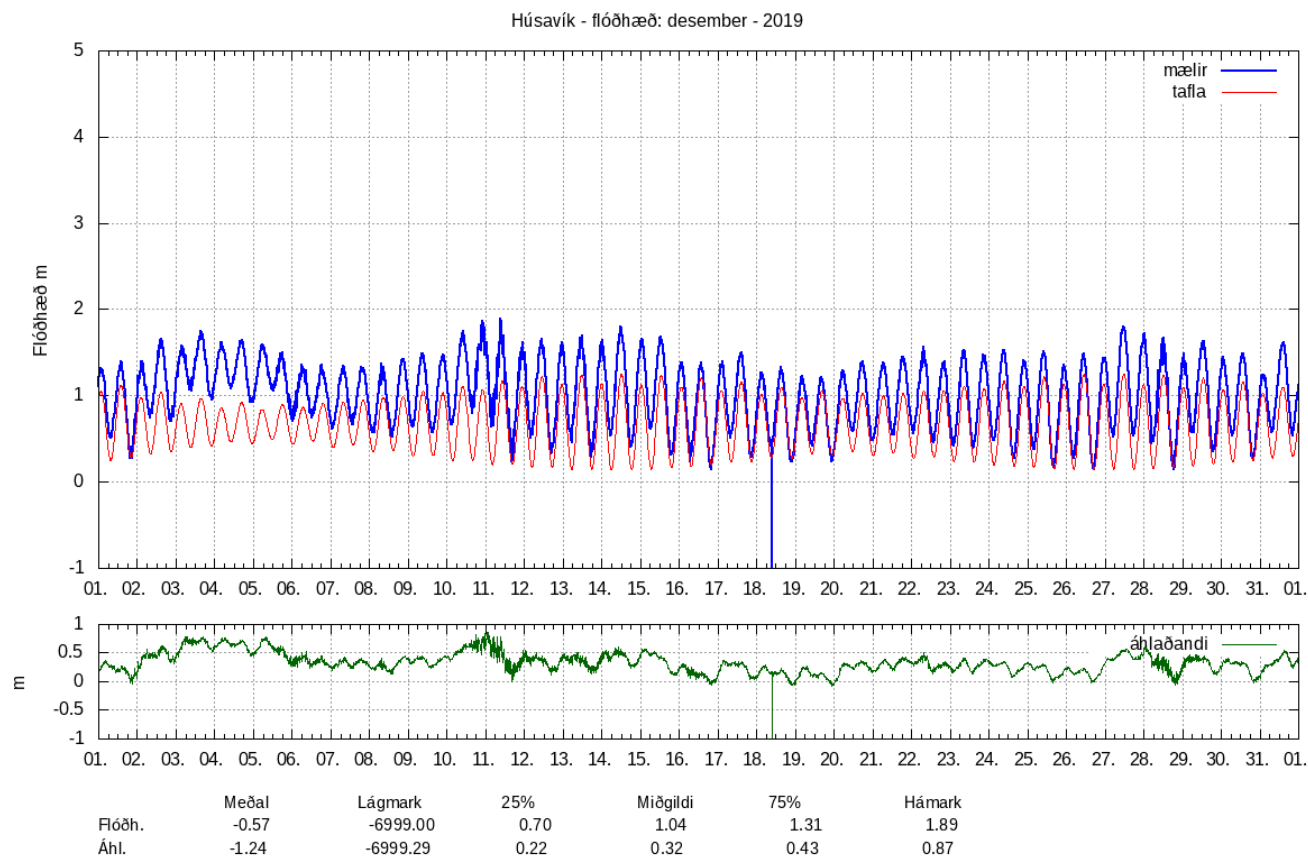
- Guðjón Scheving:
  - „The gauges generally perform satisfactorily as indicators of day to day tide levels“
  - „... need more frequent calibration of tide gauges, need to register faults and need regular maintenance.“



# Tide gauges experiences



# Tide gauges experieces

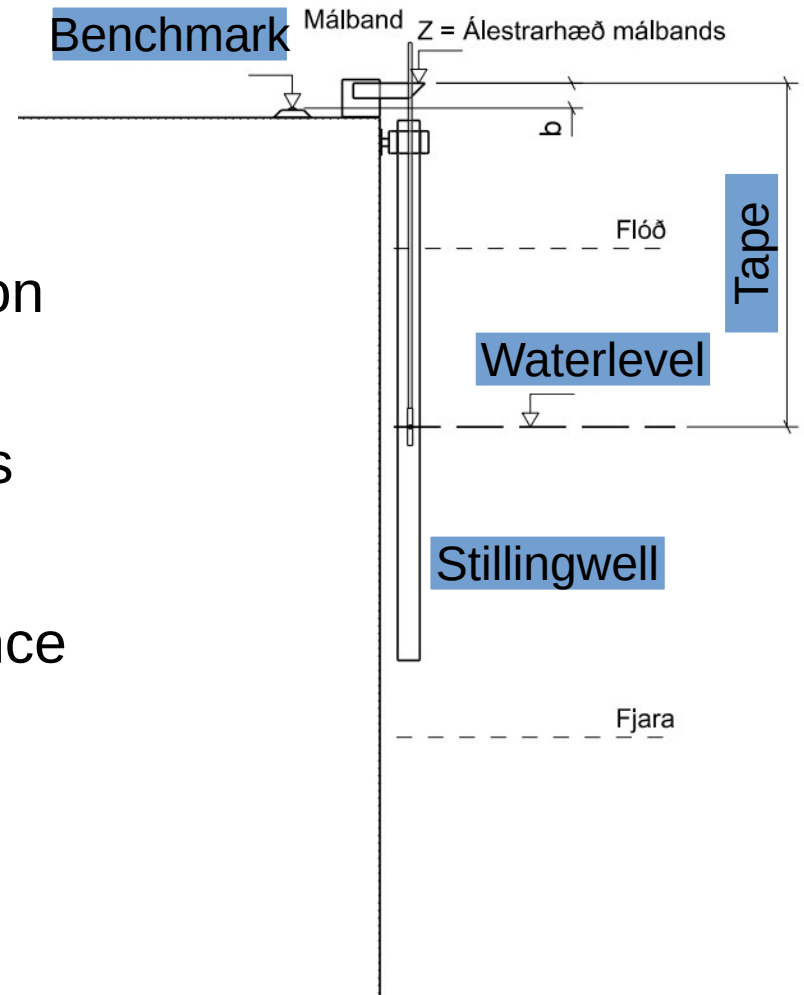


# Tide gauges

- IRCA's goal
  - „... remove and prevent systematic errors and improve data accuracy. Coordinate practises in operation of gauges and evaluation of data.“
  - Strengthen network
    - Introduce new means to aid operations
    - Install new gauges
    - Data quality indicators

# Tide gauges

- Controll of readings
  - Survey water surface elevation by hand
  - Determine “offsets” of gauges
- Benchmarks
  - Need revision and maintenance
  - 2-3 at any time
- Problem: moving water surface
  - Can overcome using special methods and/or tools



## Tide board (staff gauge)

- “Nearest thing to an ideal tide gauge”
  - No automatic readings
- Level zero on tide board to benchmark
- Anyone can read



## Choice of instrument

- Float
- Pressure transducer
- Laser/radar
- Ultra sonic
- Stilling well or no stilling well ?
- No final solution
  - Prefer adaptable universal methods

# Pressure transducer

- Matured technology
  - Barometer compensation
  - Temperature compensation
  - Good longterm stability
- Extra calibration coefficient
  - Seawater density
- Fouling of sensor



## Other types of instruments

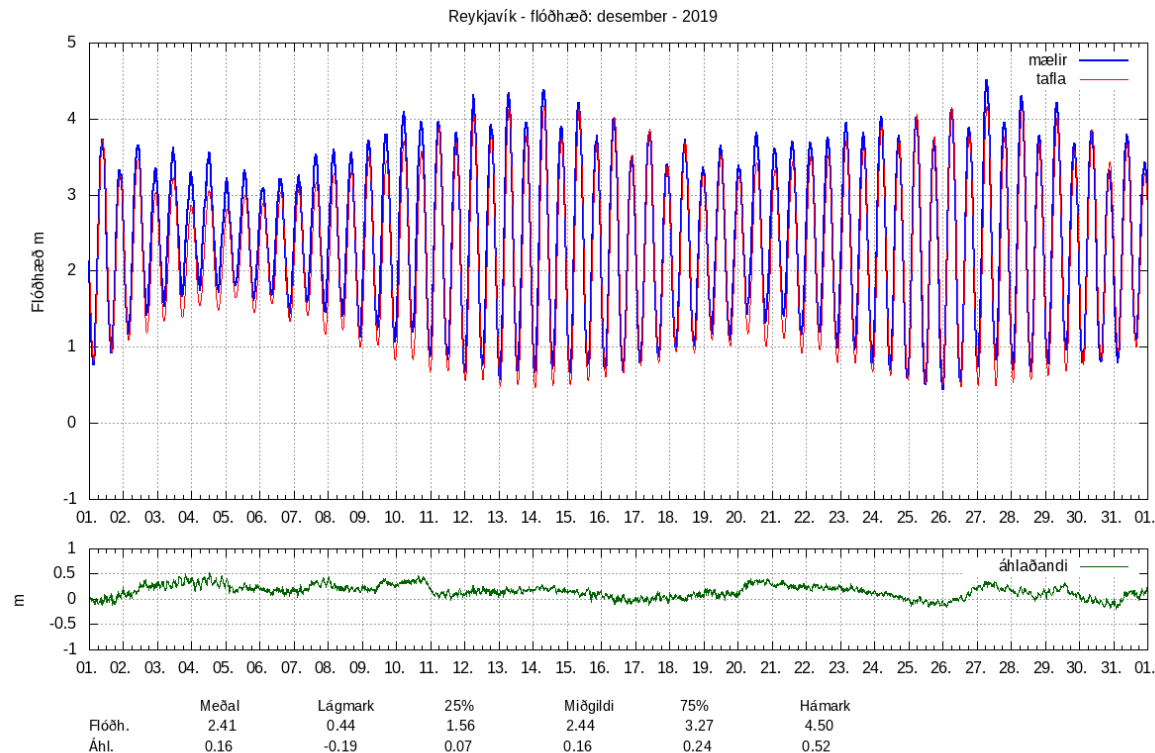
- Radar
- Ultrasonic
- Pros
  - Non contact
- Cons
  - Little experience in longterm deployment
  - Bulky installation
  - Somewhat extensive processing





# Continuous quality control

- Basic statistics and comparison with reference data



## Summary

- Present tide gauge network design philosophy
  - Can do more if we share the work
  - Decentralised ownership
  - Best intentions
- However...
  - Sealevel data from tide gauges is important
  - Need reliable data
  - Long homogeneous timeseries

# Summary

- IRCA's role
  - Reviewing role in planning of areas close to the coast, incl harbours and roads
  - responsible for coastal protection
- Future work
  - Add new gauges in locations where sealevel data is lacking
  - Install new benchmarks and tide boards
  - Perform calibrations and checks

