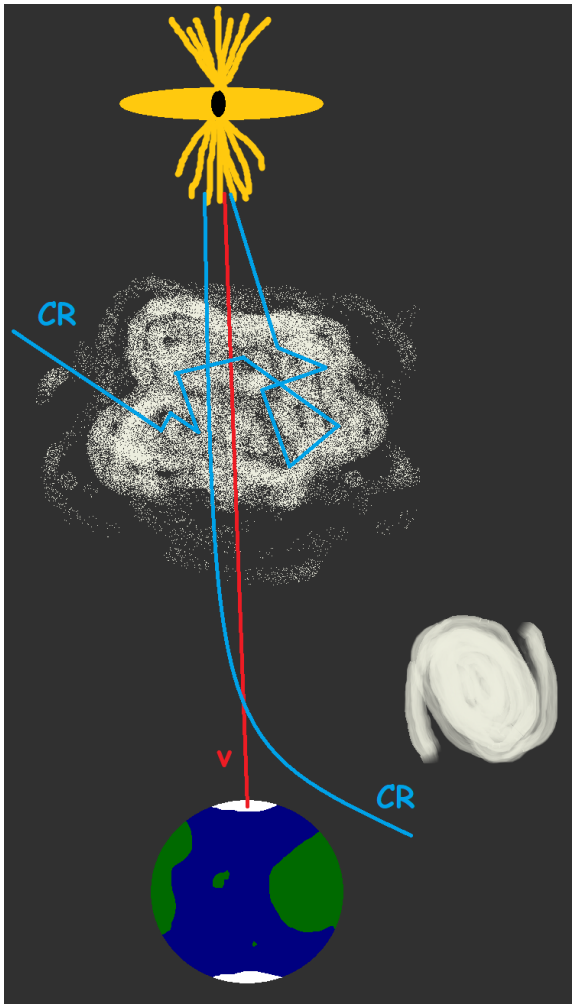
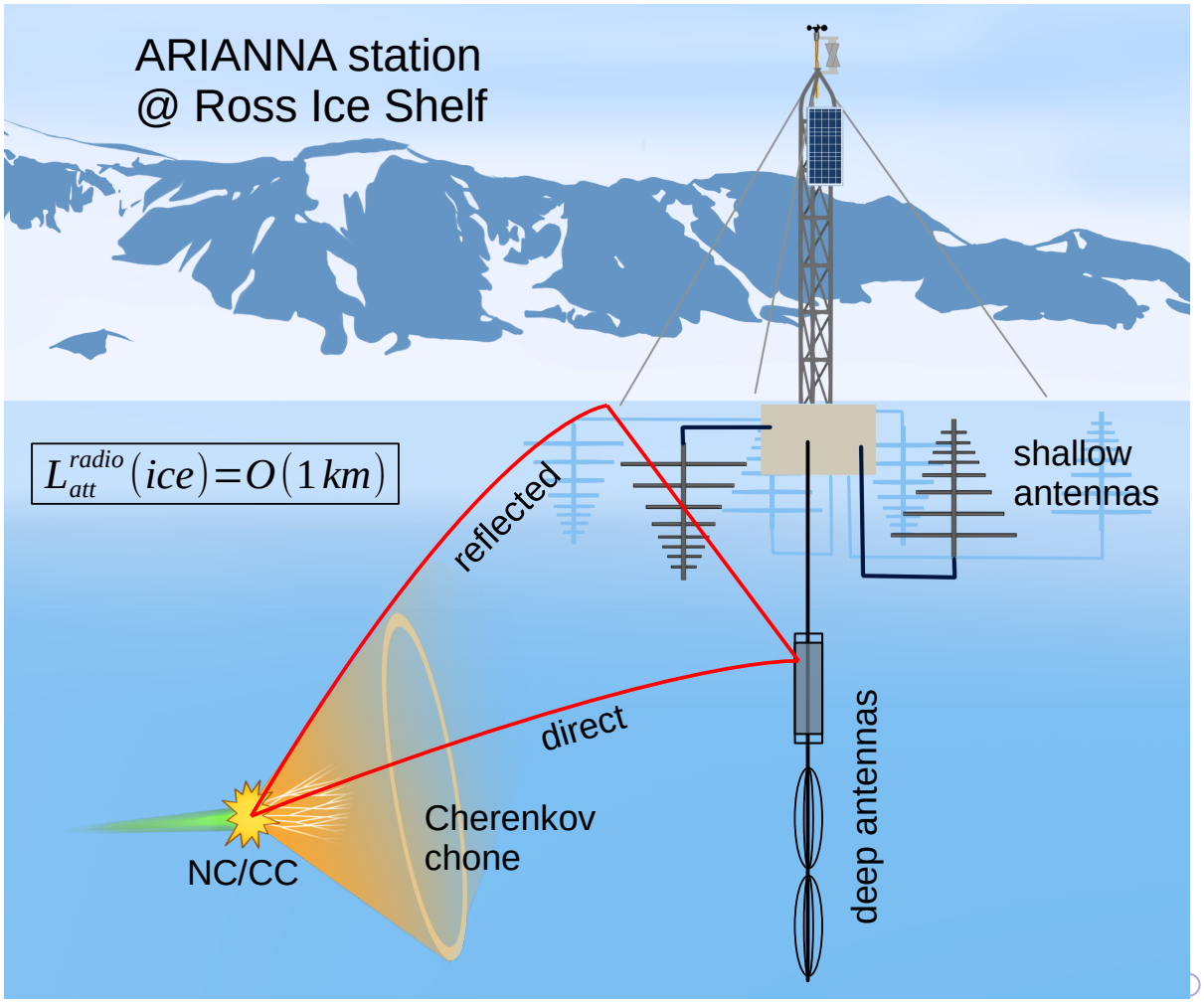
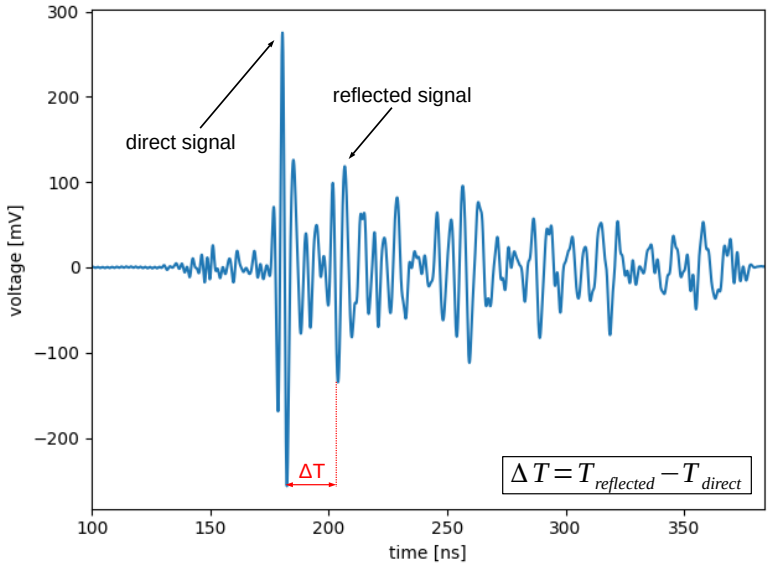
Measurement of the snow accumulation in Antarctica with a neutrino radio detector and extension to measure the index-of-refraction profile





typical radio signal



- **reconstruction:**

→ time difference ΔT → ν-vertex → ν-energy

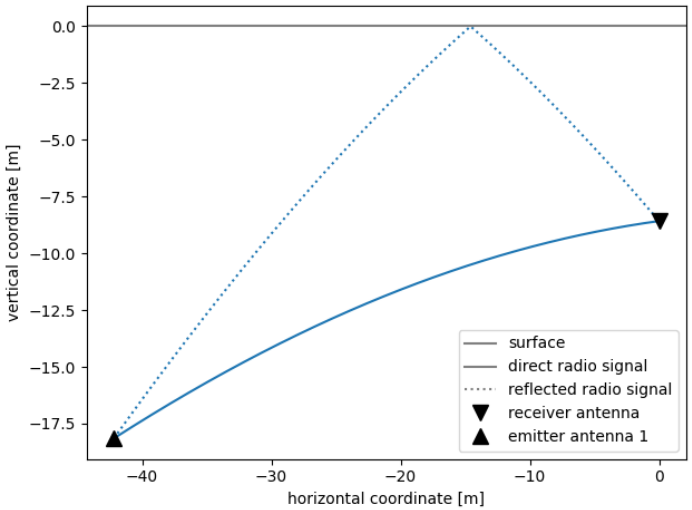
- **problem:**

→ *snow height* + *ice model* crucial parameters for reconstruction → *monitoring*

- **idea:**

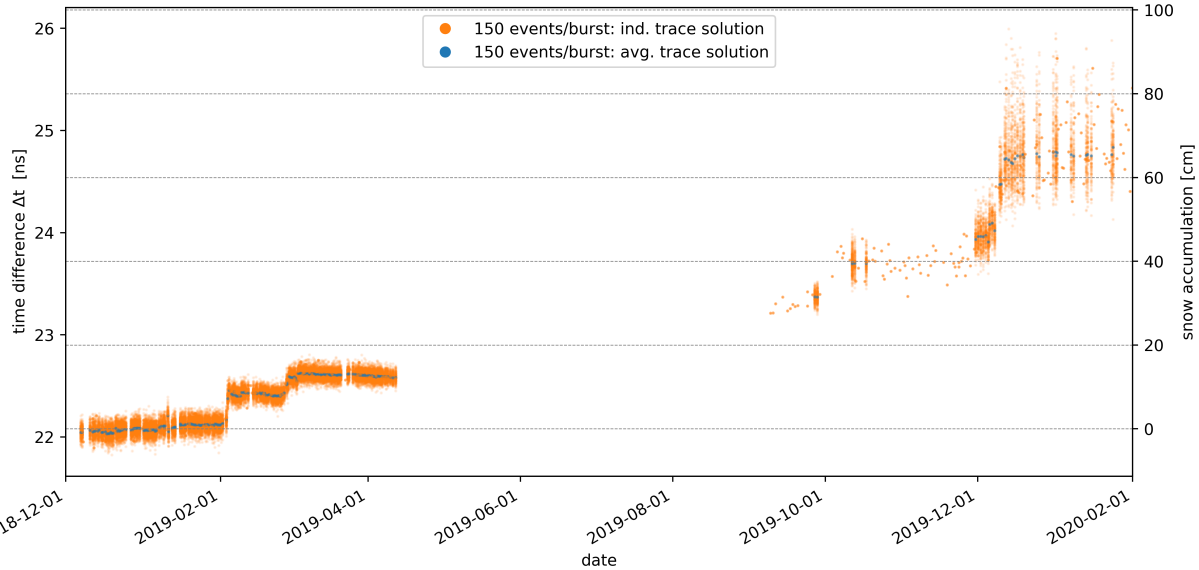
→ deploy periodically triggered radio emitters in order to fit these parameters using the artificial radio pulses

1 emitter → snow height

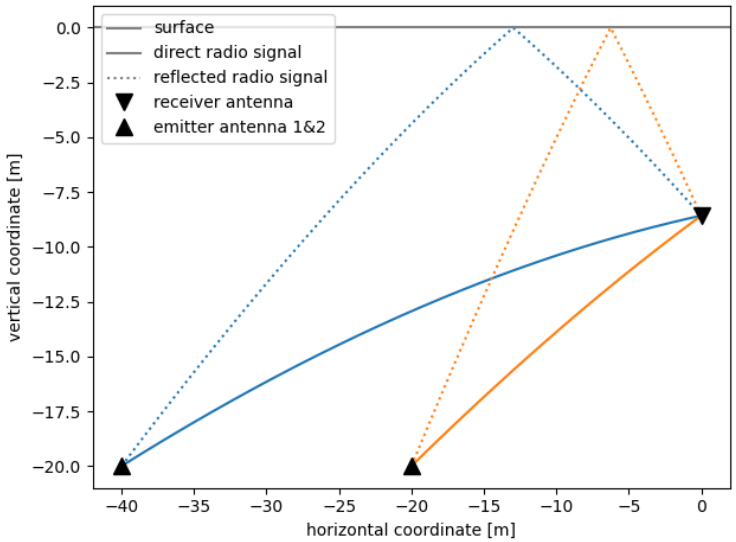


setup at station 52:
receiver dipole: 8.6 m deep
emitter dipole: 40 m away + 18.2 m deep

snow accumulation of 1 year (12/2018 - 02/2020)



2 emitter → snow height + ice properties



index-of-refraction profile:

$$n(z) = n_0 - \Delta n \cdot \exp(-z/z_0)$$

- **task:** find optimal positions of both antennas in order to reconstruct the parameters with highest resolution
- **next:** optimize for other parameters e.g. z_0, n_0

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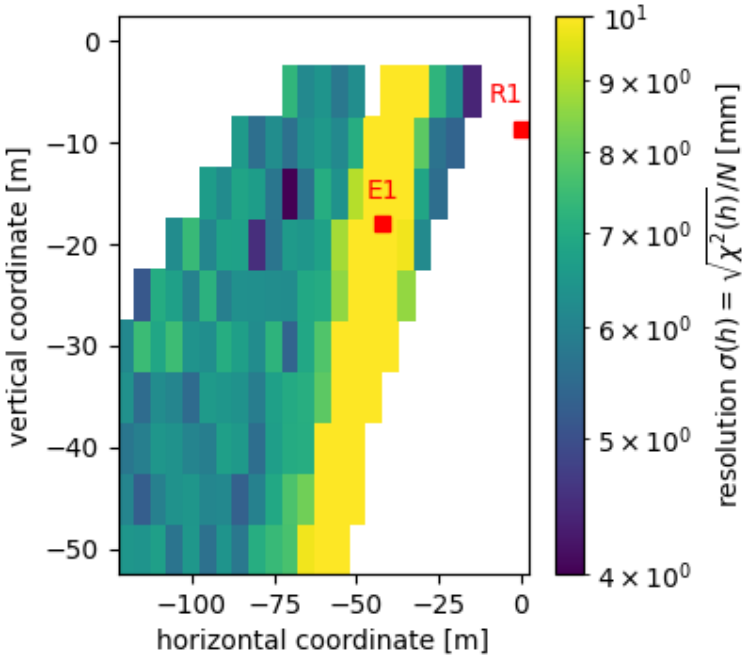

Δn