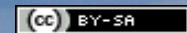




Activities in Finland in support of GPM GV

D. Moisseev, R. Cremonini, A. von Lerber, J. Leinonen, E. O'Connor, T. Pettaja, A.-M. Harri, V. Chandrasekar, J. Puliainen (UH, FMI, ARPA-Piemonte, CSU)

With support from
W. Petersen and L. Bliven
(NASA GSFC / WFF)



by smerikal

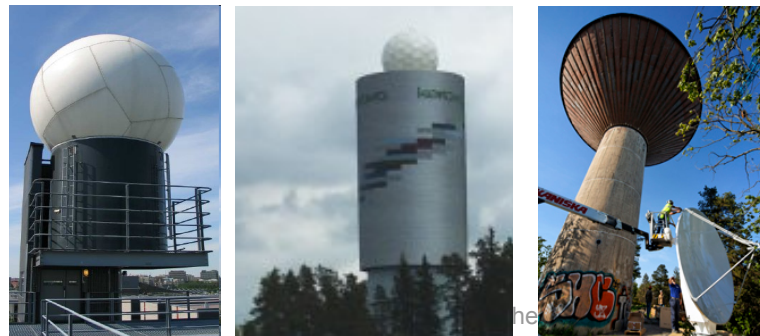
LUMI (67.4 N, 26.6 E)



BAECC (61.8 N, 24.3 E)

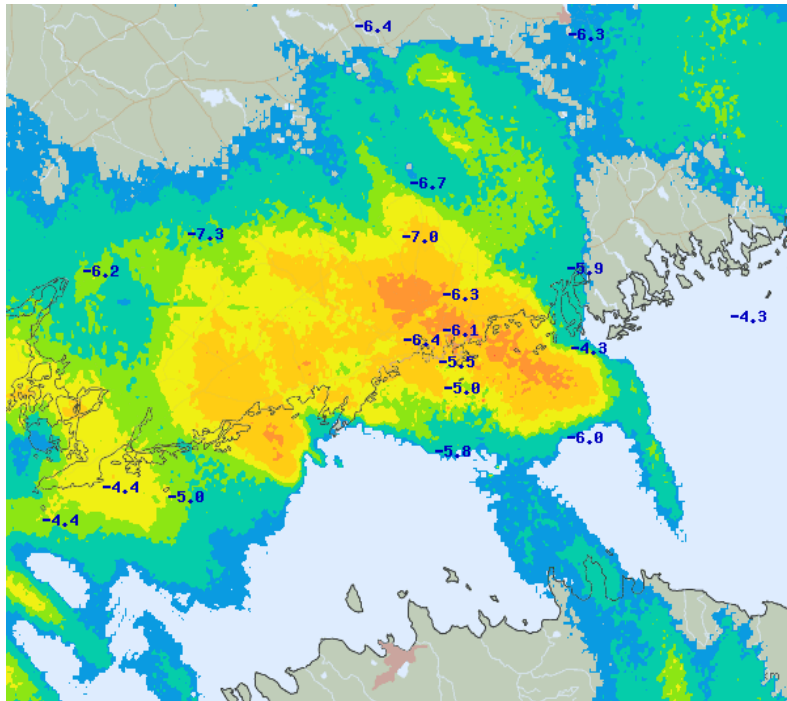


Helsinki Testbed (60 N, 25 E)





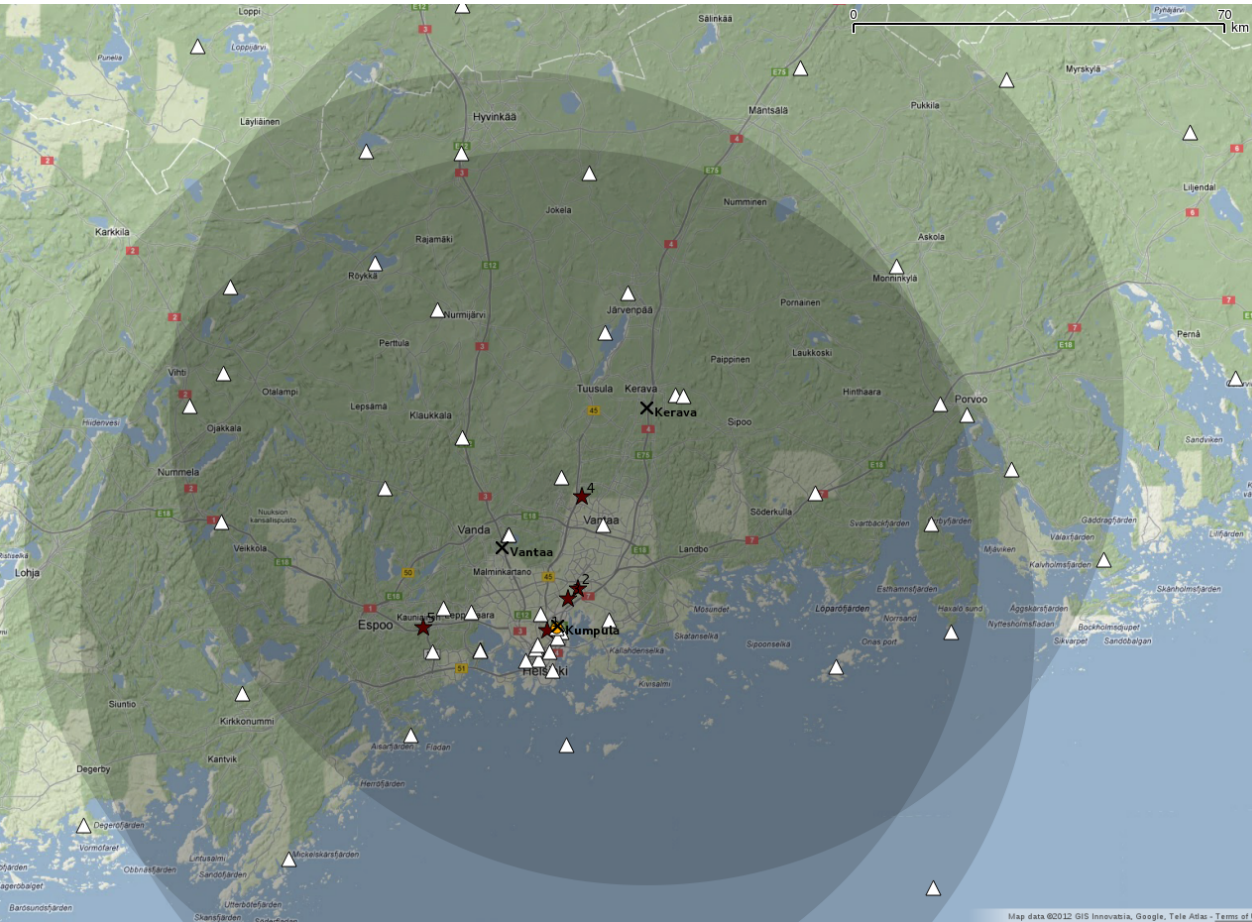
Helsinki Testbed II - QPE in Urban Environment



- Urban areas affect hydro-climate
- Urban development increases the amount of storm water and the frequency of extreme hydrological events
- In order to be useful for pluvial flood forecast, high resolution rainfall estimation needed



Helsinki Testbed II



Three radars
+

Surface stations

=

High-resolution
map of surface
precipitation



Radar visibility

- Buildings affect Kumpula and Vantaa radar coverage in Helsinki urban area
- Radar beam blockage evaluated by airborne laser scanning (ALS) data over Helsinki
 - 3 km x 3 km scanning tiles
 - 1.1-1.2 pts / m²
- Elevation accuracy is about 0.6 m (Kaartinen 2005), i.e. 0.7 deg. @ 500 m from radar site



Detail for Kumpula radar

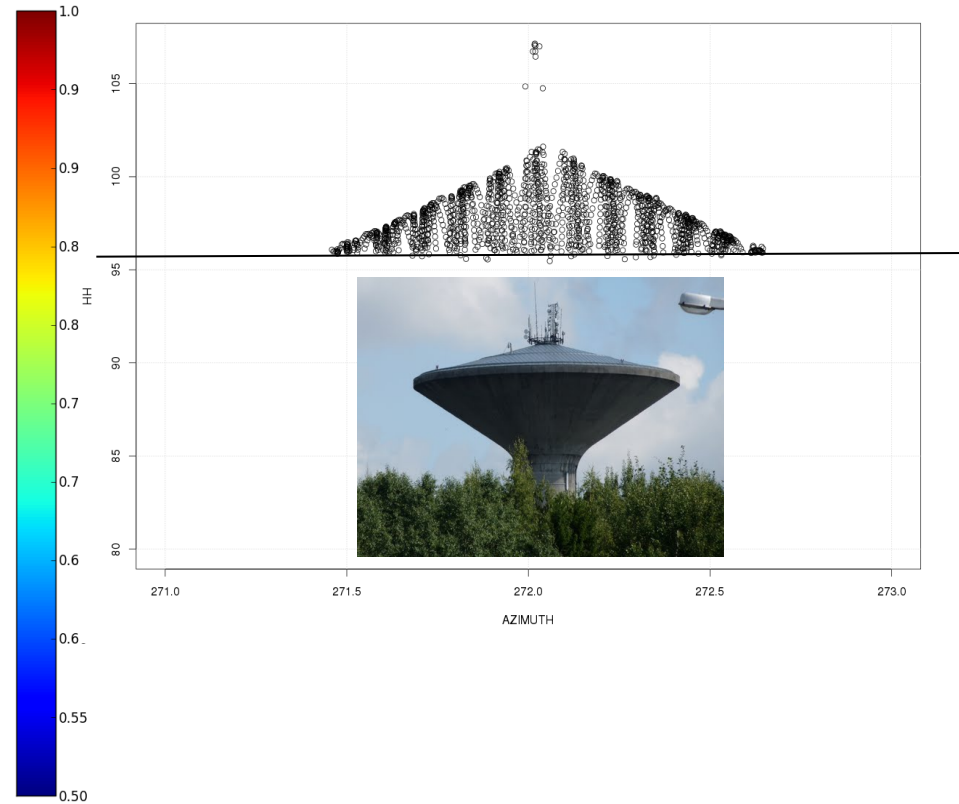
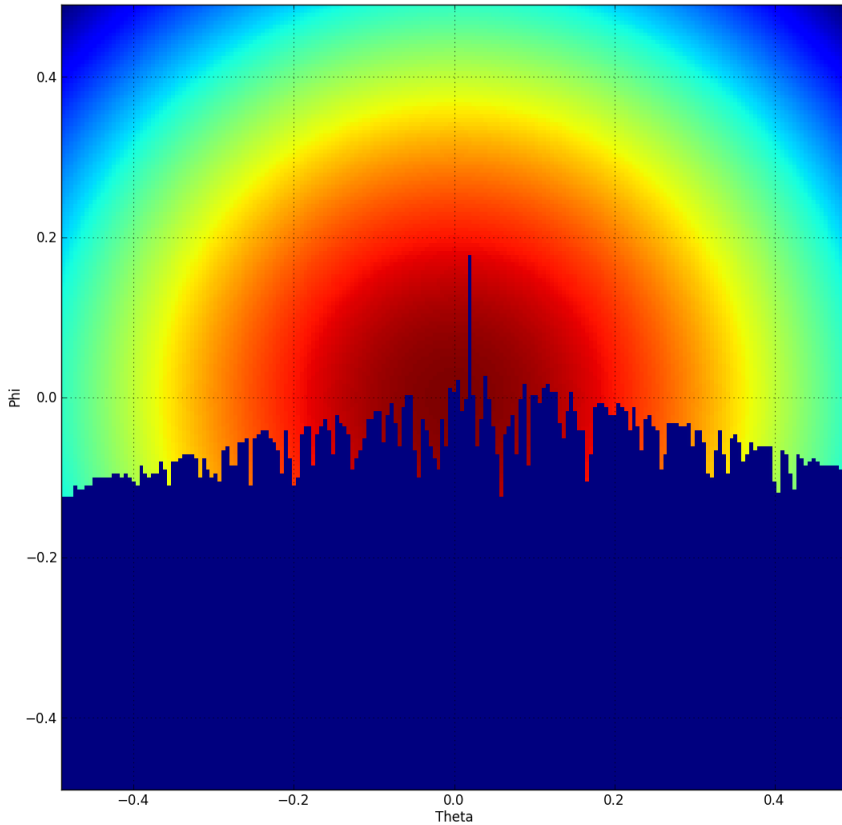




Vantaa radar

Water tower 100 m. a.s.l. – @2.1 km

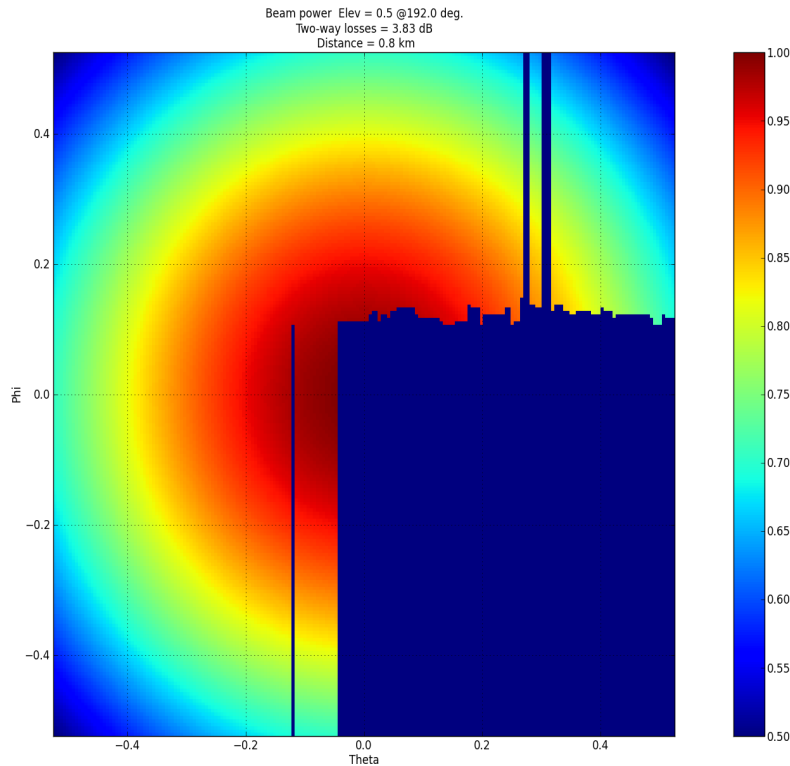
Beam power Elev = 0.5 @272.0 deg.
Two-way losses = 5.01 dB
Distance = 2.0 km



2-way losses = 5 ± 1.5 dB



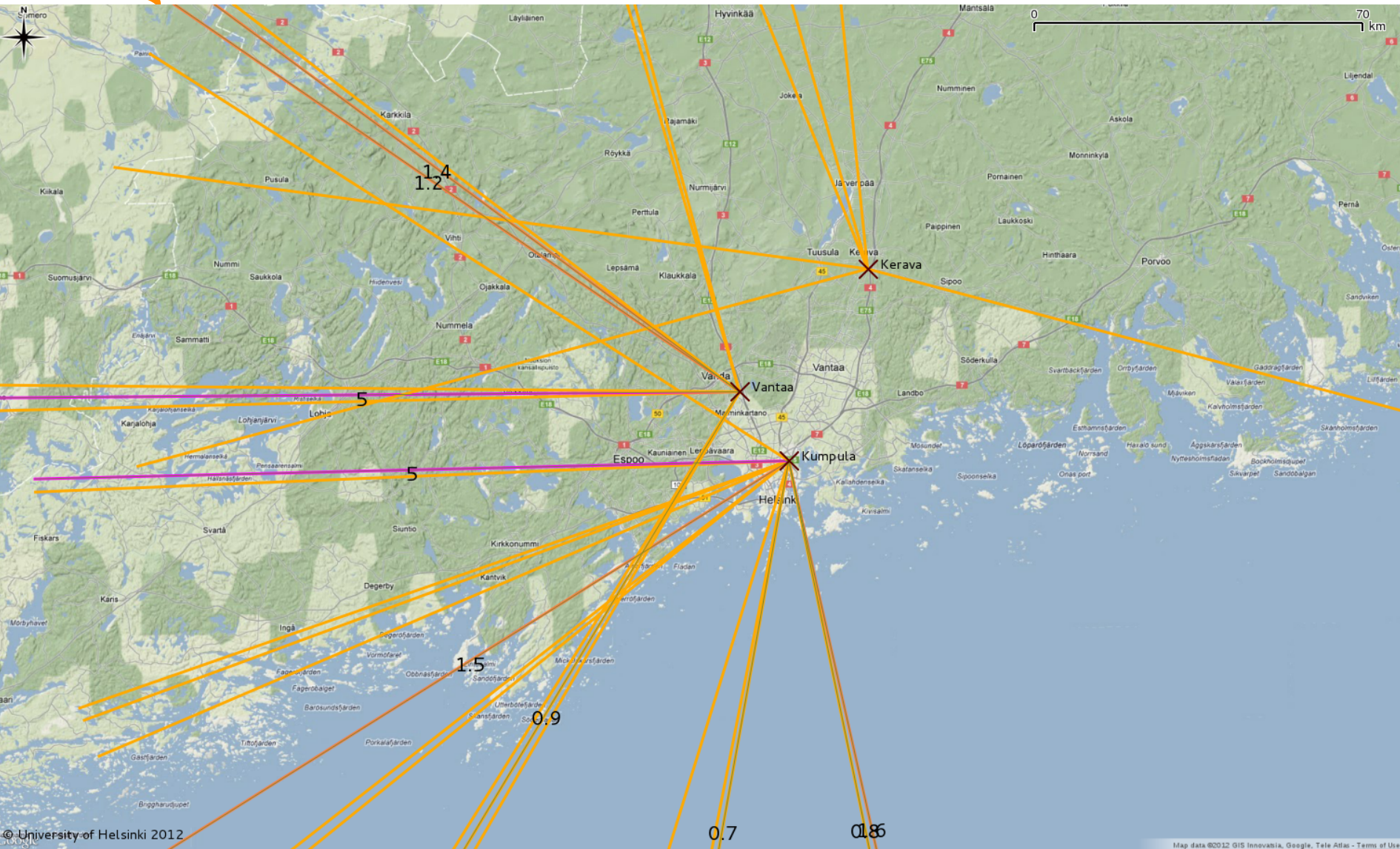
Kumpula radar Paavalin kirkko 66 m. a.s.l. – @0.8 km

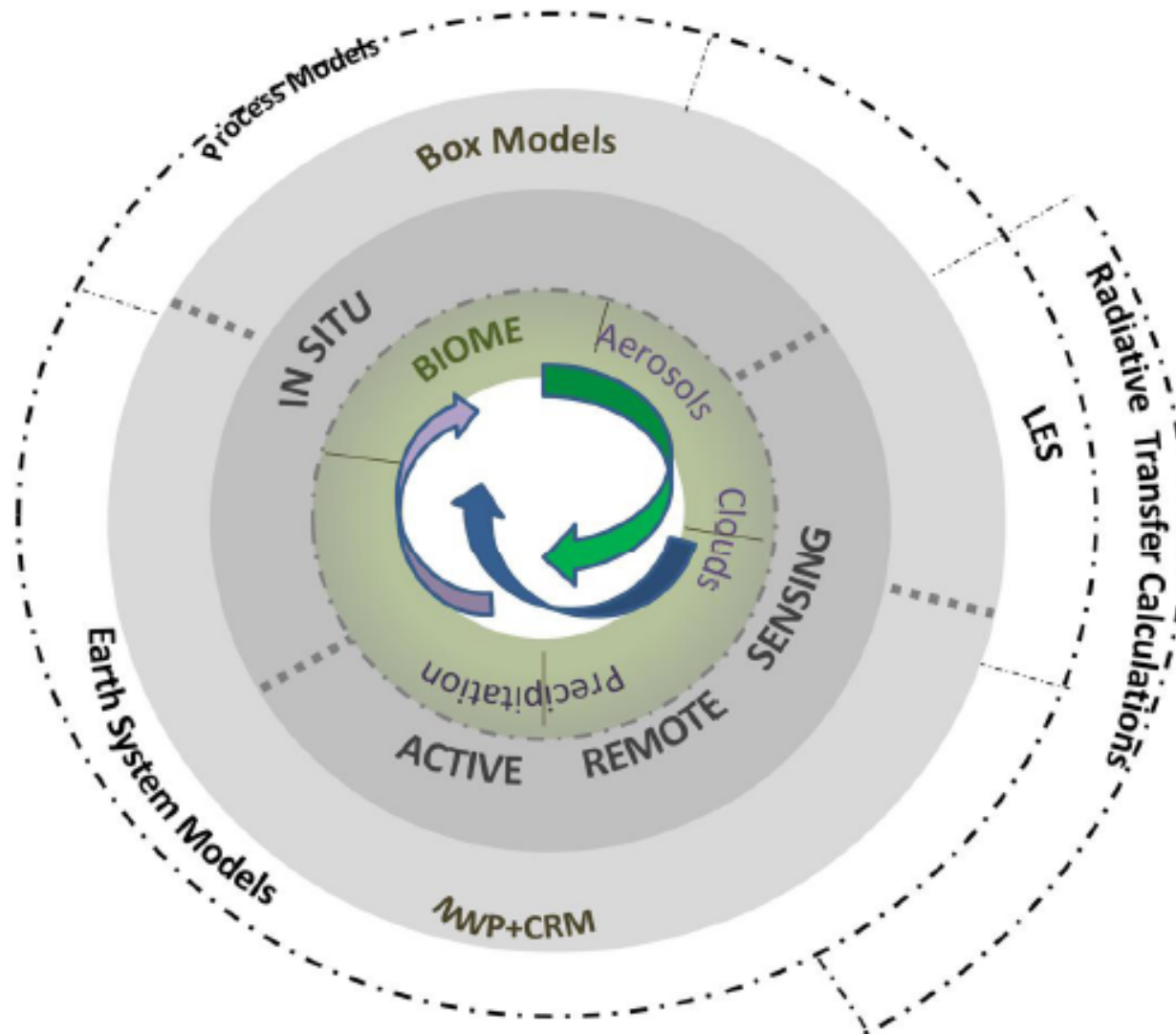


2-way losses = 3.8 dB @0.5 deg, 0.7 ± 0.3 dB @1.0 deg



Main beam-blocking (dB)







BAECC: Hyytiälä / Feb – Aug 2014

Generally:

- 1) To understand the impact of biogenic aerosol formation on cloud properties and climate

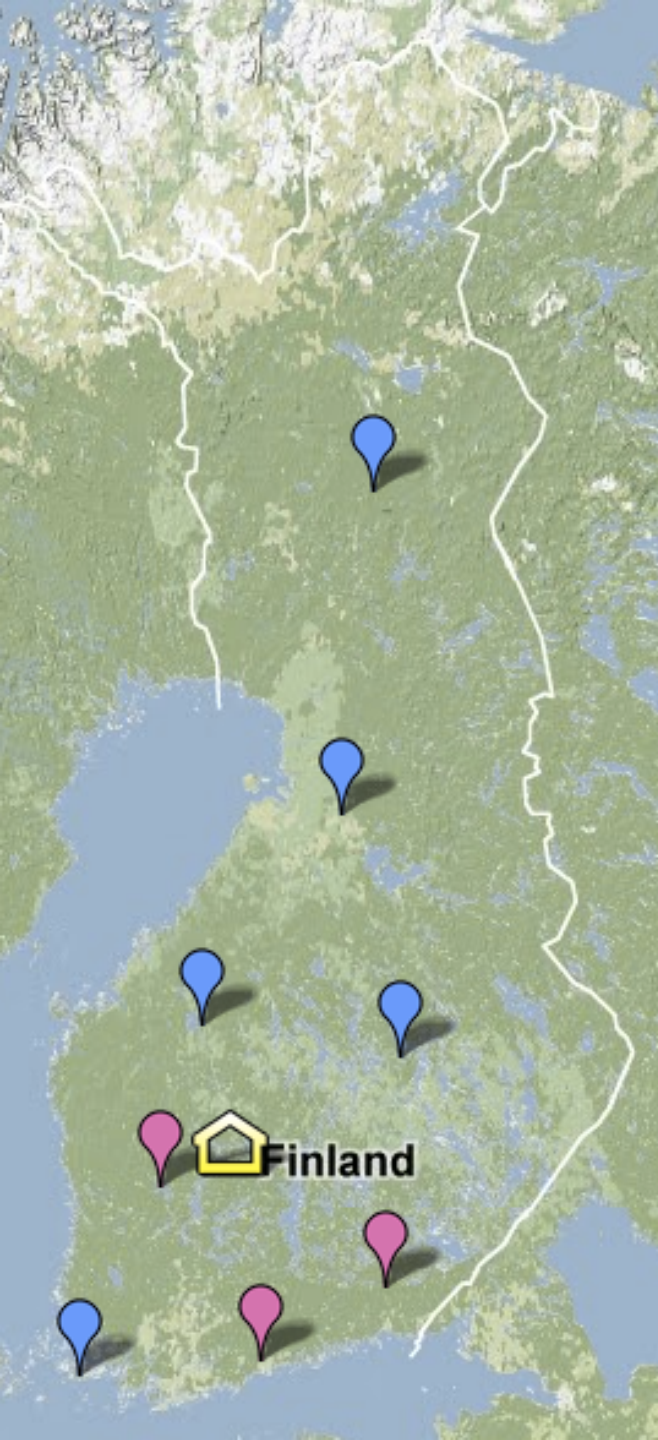
Specifically:

- 1) To resolve the role of biogenic secondary aerosol formation in cloud processes in warm, mixed phase and ice clouds over boreal environment
- 2) by utilizing AMF2 remote sensing capabilities with process-scale modeling to complete the link between our comprehensive 19-year observational record of aerosol and biosphere-atmosphere interactions to cloud processes
- 3) To expand our local observations over larger spatial scales up to Earth System behavior via hierarchy of models and satellite observations

Finnish Weather Radar Network

- 8 C-band weather radars
- 3 Dual-pol radars
- 5 Doppler radars

Closest radar is at about 65 km





BAECC – Measurement Setup



X/Ka - SACR



MWACR



KAZR



Lapland **U**nified **M**easurement **I**nfrastructure for precipitation and surface hydrology (**LUMI**)

Aim is to bridge a gap between cloud, precipitation and surface hydrology

Surface measurements – SPICE / LUMI

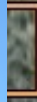
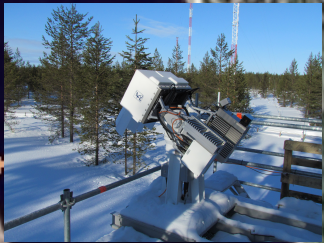
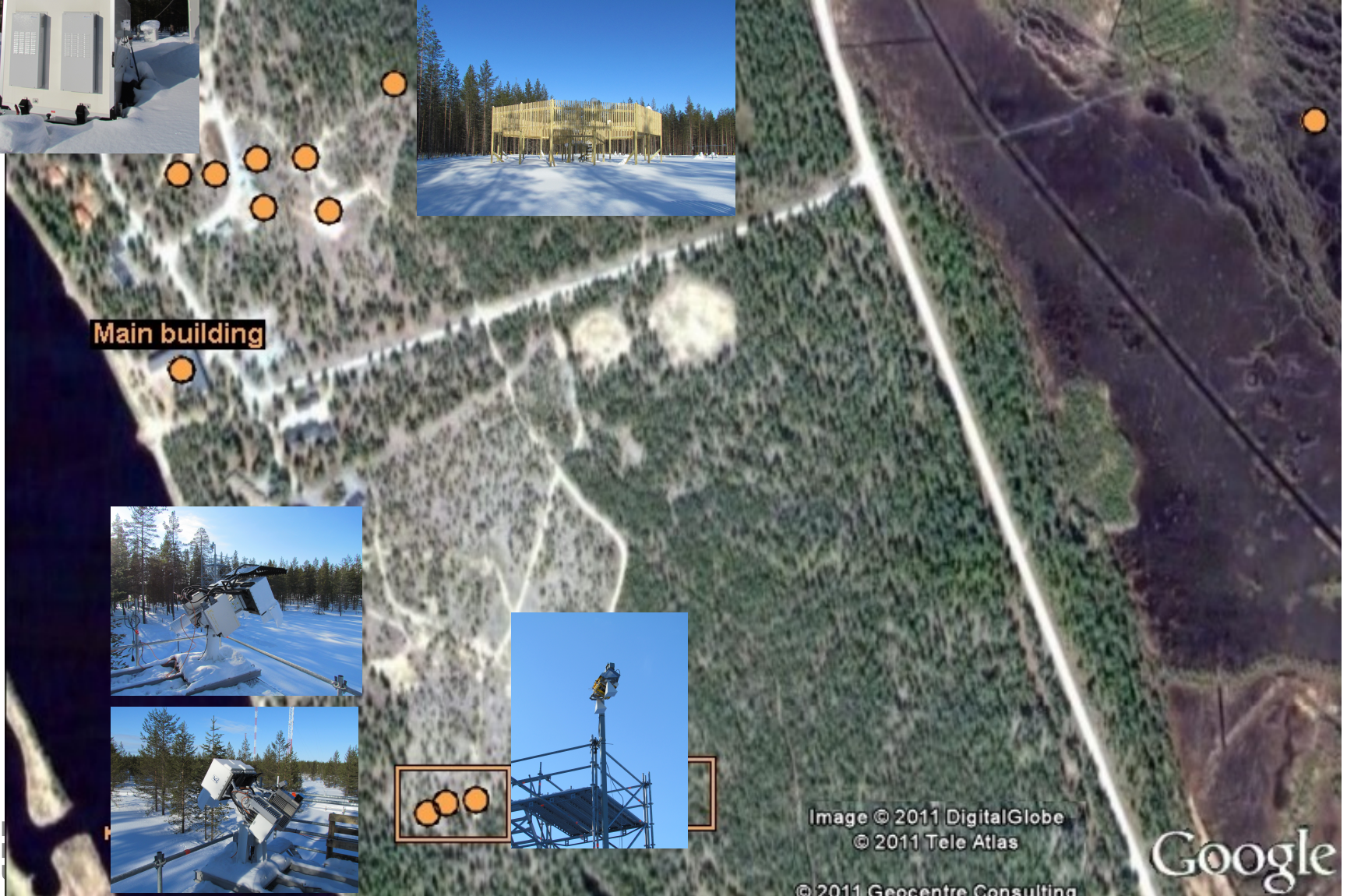


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Google



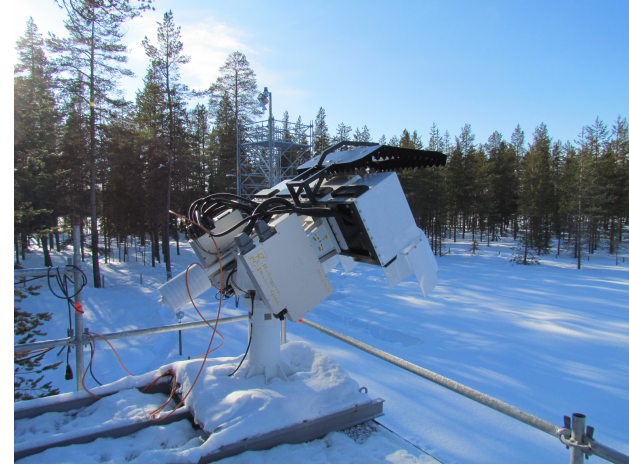
Remote sensing instrumentation



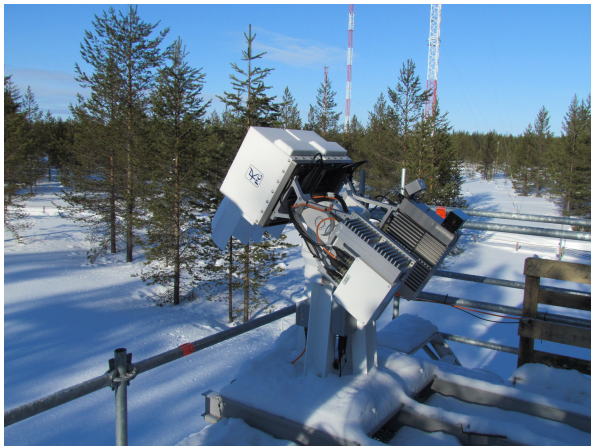
Cloud Radar – MIRA 36



Doppler Lidar



MWR – 11, 19, 21, 37 GHZ



MWR – 90, 150 GHZ
HELSINKI
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI



X/ Ku - scatterometers



Surface precipitation instrumentation



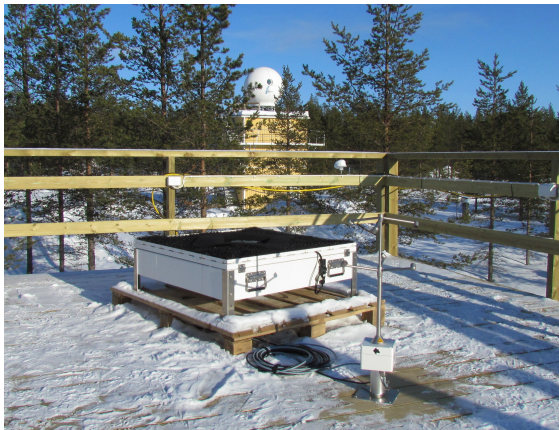
DFIR



Parsivel



PVI



2D-video & anemometer
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI



Thies - disdrometer



+ FMI contribution to SPICE
www.helsinki.fi/joipiso

Summary

- We are in process of merging resources and infrastructure from various research groups at FMI and UH
- The goal is to study cloud lifecycle, soil hydrology, high latitude precipitation
- As a result we (will) have a very comprehensive suit of instruments to study high-latitude precipitation

