ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Homage to

Asko Huuskonen

1956-2021

Outlook of this session

Part 1: Asko’s life and career

Part 2: Solar monitoring

Part 3: Free word

Remote guests

Elena Saltikoff

- ICOS, Head of Observations
- OPERA 4 PM
- Asko's long time colleague at FMI

Daniel Michelson

- ECCC, Research Manager
- SHMI delegate at OPERA 2 & 3
- Solar monitoring implementations around the Globe

Iwan Holleman

- Radboud University, Director Information & Library Services
- OPERA 3 PM and KNMI delegate at OPERA 1 & 2
- Asko's friend and co-author (9 papers)

Part 1

Asko’s life and career

Geography of Asko

- Was born at Kiuruvesi in 1956
- Studied at the University of Oulu
- Sodankylä Geophysical Observatory
  - EISCAT facility
- FMI at Helsinki
- Home at Vantaa

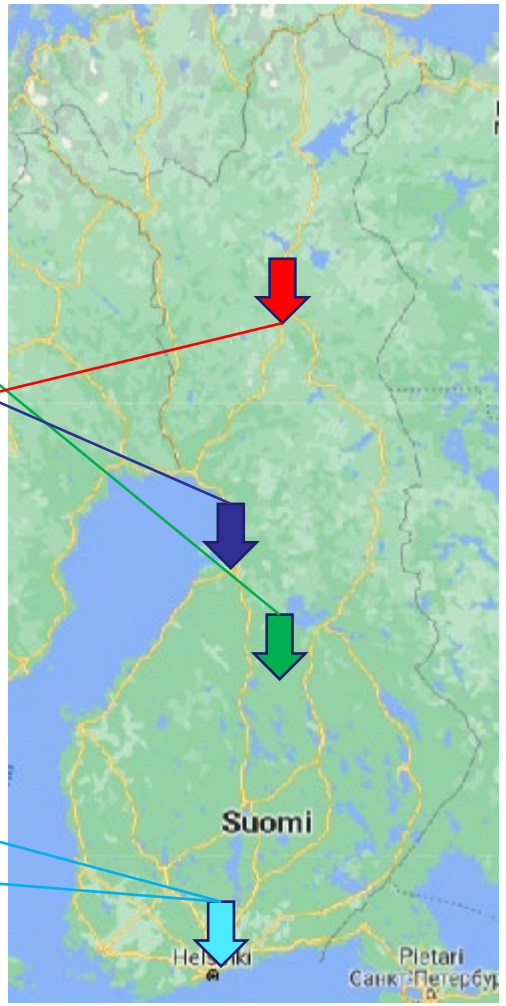
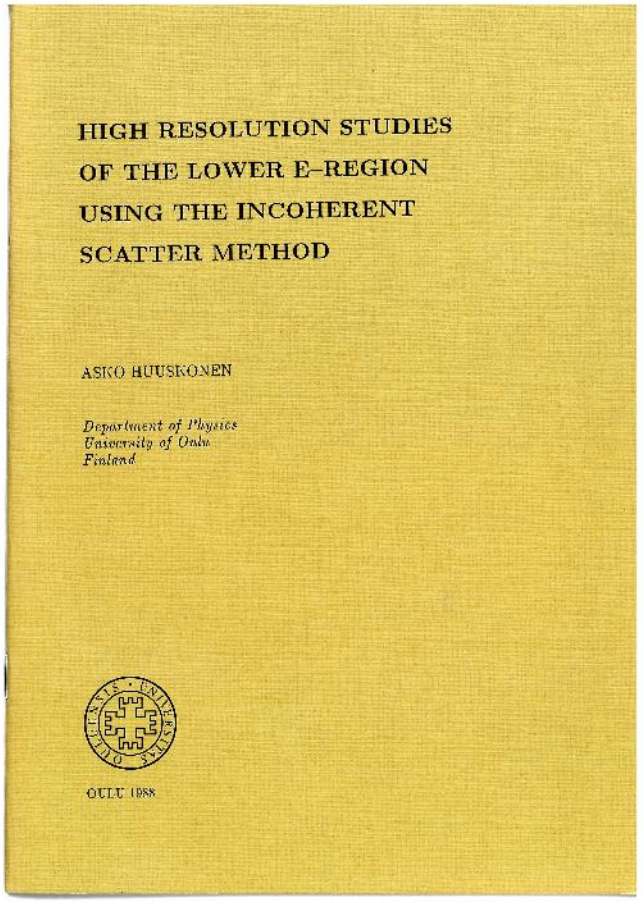


Photo: Jari Heiskanen 2007

Physicist

- Graduated from Kiuruvesi high school 1975
- Started studies of physics and mathematics at the University of Oulu 1975
- Graduated 1981 as physicist at the University of Oulu. Master's thesis was about time series analysis of geophysical observations.
- Doctoral dissertation in 1988 consisted of six papers about the measurement techniques and applications of EISCAT ionospheric radars



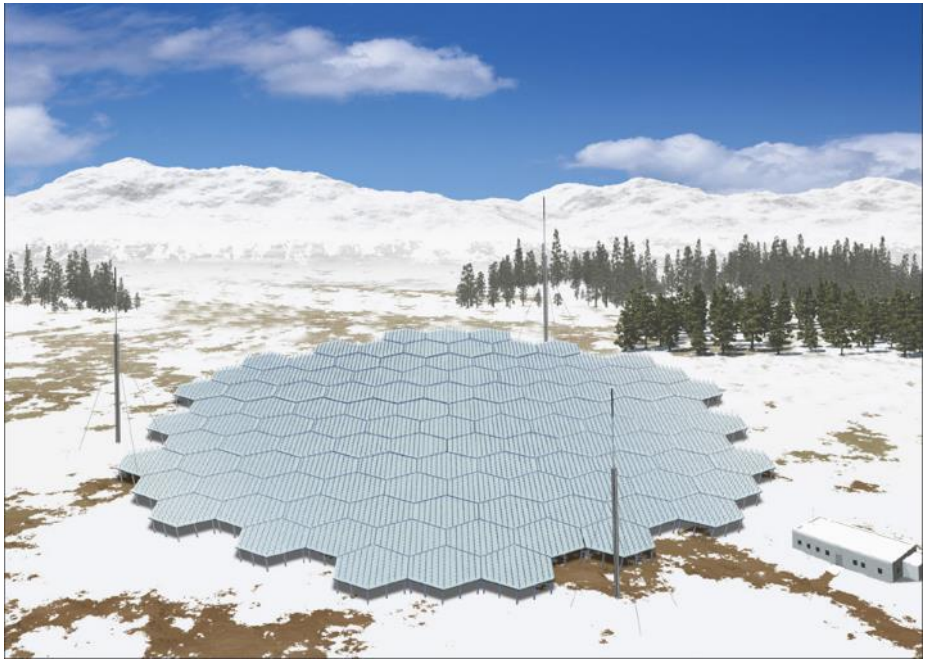
• EISCAT at Sodankylä

EISCAT = European Incoherent Scatter Scientific Association
The EISCAT Scientific Association was founded in 1975

- Asko was in charge of the national EISCAT data laboratory in 1989-1991
- Tristatic VHF radar system started in 1981
- Three VHF (~230 MHz) radars in Sweden, Norway and Finland
  - Steerable antenna dish diameters 32 m
  - 1-2 MW klystrons
  - Binary phase coded pulses
  - Cooled receivers
- 1985 UHF (~930 MHz) radar in Norway
- 1996 monostatic UHF (~500 MHz) radar in Svalbard
- Used for research of ionosphere

EISCAT 3D

- EISCAT3D under construction in Finland, Sweden and Norway
- Five sites receiving, one site transmitting at 233 MHz
- Active phase array antennas
  - Each site 10 000 crossed dipole antenna elements
- Advanced interferometry capabilities



EISCAT3D tests site in Tromsø, Norway

Physicist – Ionosphere researcher

- Asko worked 1989 - 1991 as a research scientist at the University of Oulu. He spent six months as visiting scientist in Southampton and Aberystwyth.

- 1991-1998 Asko worked at FMI at Geomagnetic Research group.
  - Ionosphere-magnetosphere interaction
  - Atmospheric gravity waves and tidal waves
  - EISCAT development

- Docent of Physics (University of Oulu)

- Docent of Space Physics (University of Helsinki).

- 45 peer-reviewed international publications in the field of ionespheric sciences!

From ionosphere to atmosphere

- 1998-1999 Asko worked a year in a spin-off company Invers Oy as a project manager
- They developed SMPRF (Simultaneous Multiple Pulse Repetition Frequency) code that was intended to solve the range–Doppler dilemma with Doppler weather radars
- Asko was one of the authors in their publication in Journal of Applied Meteorology 44(9):1375-1390, 2005

A Proposed Solution to the Range–Doppler Dilemma of Weather Radar Measurements by Using the SMPRF Codes, Practical Results, and a Comparison with Operational Measurements

JUHA PIRTTILÄ* AND MARKKU S. LEHTINEN

Sodankylä Geophysical Observatory, Sodankylä, Finland

ASKO HUUSKONEN

Finnish Meteorological Institute, Helsinki, Finland

MARKKU MARKKANEN

Eigenor Oy, Ltd., Helsinki, Finland

(Manuscript received 3 May 2004, in final form 10 April 2005)

Weather radar specialist

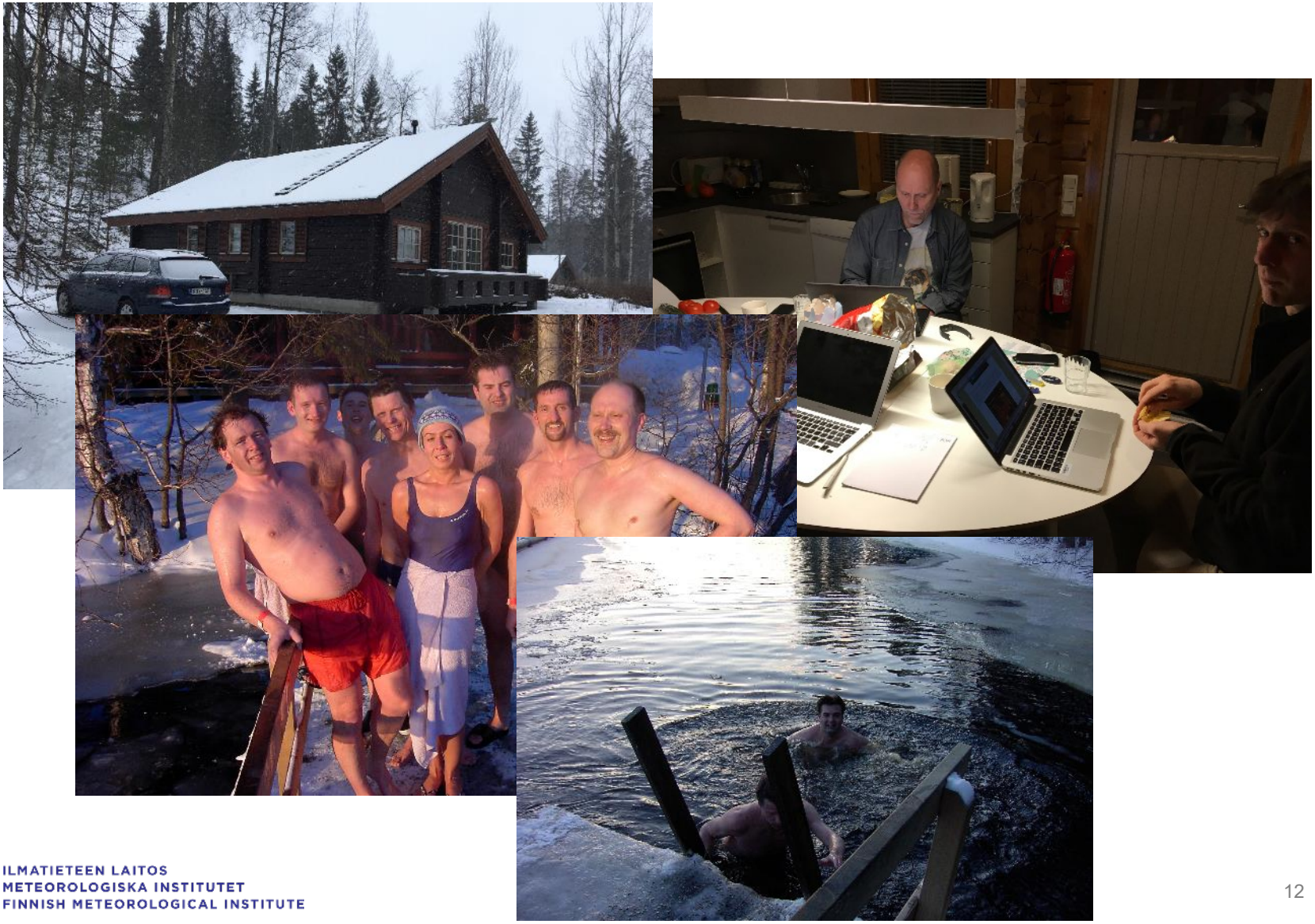
- 1999 Asko came back to FMI to Observation Services and started the work with weather radars.
  - Head of group in 2004-2010
  - Quality manager of the Observations unit 2016 on (ISO 9001:2015)
  - Frequency protection
  - Wind turbine impact analysis

- Network development
  - In 1999 FMI had 6 weather radars and now 11.

- Development of various monitoring systems
  - Solar monitoring
  - Radar pair-to-pair comparison
  - ZDR zenith calibration

- Asko has 14 peer-reviewed international articles in the field of weather radars. The 15th was accepted for publication just few days ago!

Sauna Science



Time for OPERA!

- OPERA is the Radar Programme of EUMETNET established in 1999
- Asko was the first delegate of FMI in OPERA 1 since 1999
- OPERA 2 PM 2004-2006
  - Data Hub, BUFR, …
- OPERA 3 PM 2010-2012
  - ODC, ODIM, HDF5,….

Time for Opera!

- His role as a mentor during OPERA 4 and OPERA 5 was significant

- In OPERA 4 Asko was leading the work to take the solar monitoring system into use in the whole OPERA area. He continued to develop the system all the way.

Around the Globe

- 2002-2004 Asko was helping Poland to establish their weather radar network
- 2013-2014 Asko was in Ecuador and Colombia teaching local radar specialists
- 2013-2018 Asko visited Nepal several times helping to establish a weather radar network to Nepal
- Since 2016 Asko was involved with weather radar project in Jamaika






Asko

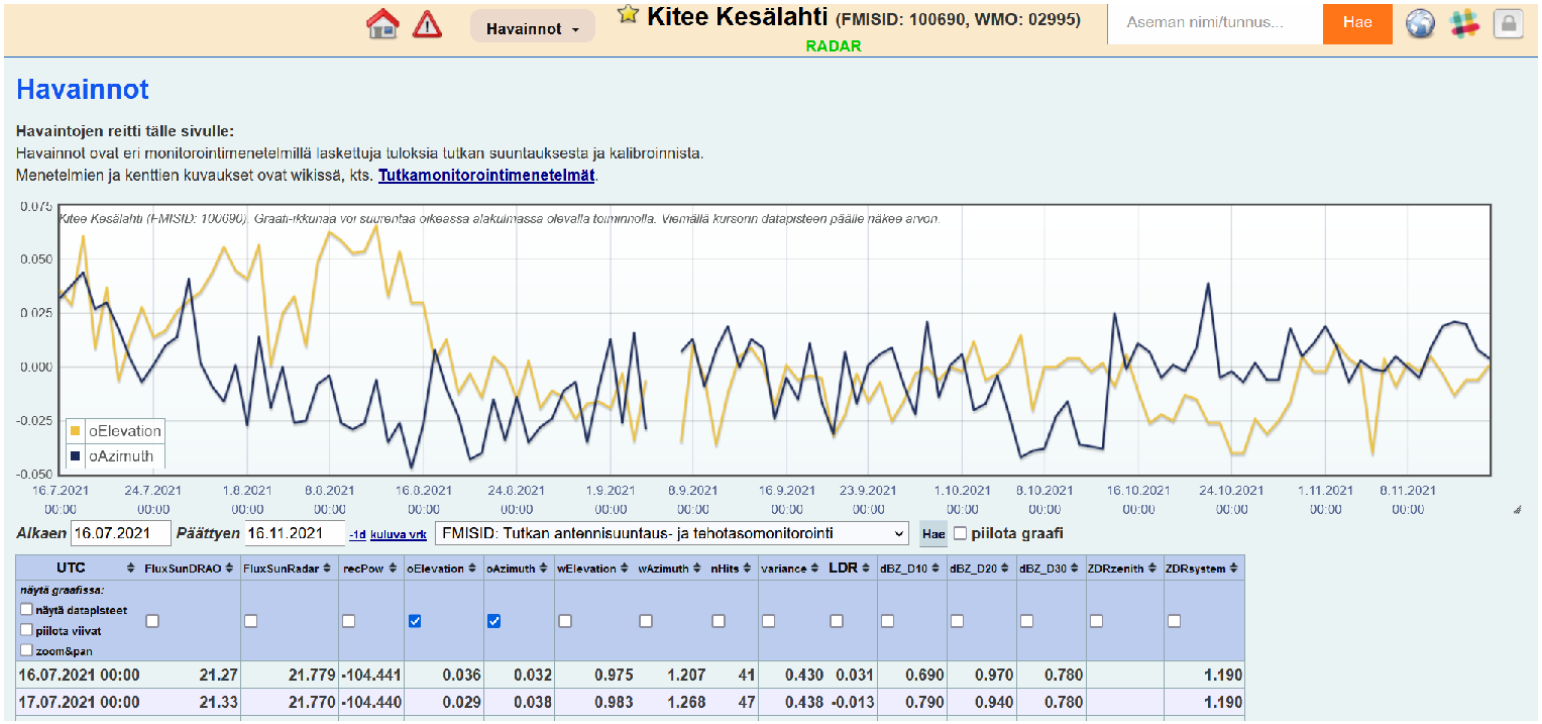
- Asko was a distinguished scientist but most of all he was a really nice person and beloved colleague. He was a gentleman who was always ready to help others with his positive attitude and great humour

- Asko was mathematically really talented and his knowlage of history, science and life in general was huge!

- Asko was a brigde builder. He often found win-win solutions in difficult negotiations and disputes. With his pragmatic approach and logical thinking he was able to reach the targets and solve the current problems

Part 2

Solar monitoring



The Beginning

- In the early days of OPERA, Asko met Iwan Holleman (KNMI), and the co-operation to develop the solar monitoring system started. They published together nine peer-revied articles with many co-authors.

1. JAOT 2007
2. JAOT 2010a
3. JAOT 2010b
4. Radio Science 2013
5. BAMS 2014
6. JAOT 2014
7. Atmospheric Measurement Techniques 2016
8. Advances in Meteorology 2017
9. JAOT 2021

JAOT = Journal Of Atmospheric and Oceanic Technology

The Mother of all solar monitoring papers
JAOT 2007

476 JOURNAL OF ATMOSPHERIC AND OCEANIC TECHNOLOGY VOLUME 24

Determining Weather Radar Antenna Pointing Using Signals Detected from the Sun at Low Antenna Elevations

ASKO HUUSKONEN

Finnish Meteorological Institute, Helsinki, Finland

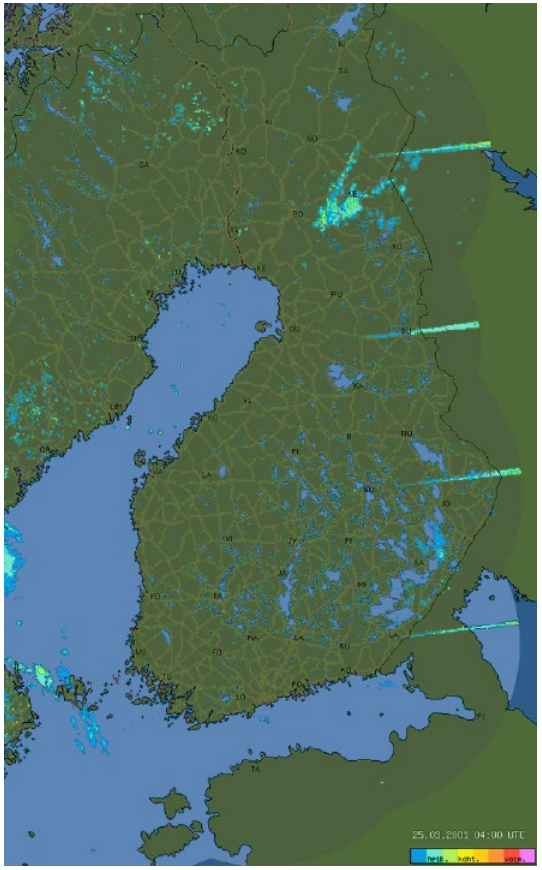
IWAN HOLLEMAN

Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands

(Manuscript received 27 March 2006, in final form 28 June 2006)

The Mother of all Solar monitoring papers
JAOT 2007

- The method and concept of Solar monitoring was introduced
- Operational PPIs are used for the analysis
- Analysis for antenna AZ and EL pointing



Extension to solar Az & El monitoring
JAOT 2010a & JAOT 2010b

Operational Monitoring of Weather Radar Receiving Chain Using the Sun

IWAN HOLLEMAN
Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands

ASKO HUUSKONEN AND MIKKO KURRI
Finnish Meteorological Institute, Helsinki, Finland

HANS BEEKHUIS
Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands

(Manuscript received 28 August 2008, in final form 10 August 2009)

- Receiver chain power level monitoring
- Comparison of the levels with DRAO

Operational Monitoring of Radar Differential Reflectivity Using the Sun

IWAN HOLLEMAN
Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands

ASKO HUUSKONEN
Finnish Meteorological Institute, Helsinki, Finland

RASHPAL GILL
Danish Meteorological Institute, Copenhagen, Denmark

PIERRE TABARY
Météo-France, Toulouse, France

(Manuscript received 20 August 2009, in final form 17 December 2009)

- Solar signal includes all polarization
- Can be used to monitor the ZDR (LDR) of the receiver chain

Refraction for low elevation angles

Radio Science 2013

RADIO SCIENCE, VOL. 48, 226–231, doi:10.1002/rds.20030, 2013

Analytical formulas for refraction of radiowaves from exoatmospheric sources

Iwan Holleman[1] and Asko Huuskonen[2]

Received 20 November 2012; revised 26 March 2013; accepted 1 April 2013; published 30 May 2013.

- With low elevation scans the refraction has to be taken into account in the analysis
- The outcome of this paper was, that 5/4 – Earth radius model is better in low elevations than the traditional 4/3 –model

OPERA in a nutshell
BAMS 2014

THE OPERATIONAL WEATHER RADAR NETWORK IN EUROPE

BY ASKO HUUSKONEN, ELENA SALTIKOFF, AND IWAN HOLLEMAN

The European Operational Program for Exchange of Weather Radar Information (OPERA) has worked to improve harmonization of radar systems and measurements since 1999 and has recently started production of network-wide radar mosaics.

Angular width of the solar signature
JAOT 2014

Radar Performance Monitoring Using the Angular Width of the Solar Image

ASKO HUUSKONEN, MIKKO KURRI, AND HARRI HOHTI
Finnish Meteorological Institute, Helsinki, Finland
HANS BEEKHUIS AND HIDDE LEIJNSE
Royal Netherlands Meteorological Institute (KNMI), De Bilt, Netherlands
IWAN HOLLEMAN
Institute for Molecules and Materials, Radboud University Nijmegen, Nijmegen, Netherlands

(Manuscript received 18 November 2013, in final form 9 May 2014)

- The width of the sun image in elevation and in azimuth is analyzed
- Can be used to monitor the antenna & pedestal performance and signal processing

The Award
AMT 2016

Atmos. Meas. Tech., 9, 3183–3192, 2016
www.atmos-meas-tech.net/9/3183/2016/
doi:10.5194/amt-9-3183-2016

Atmospheric Measurement Techniques Open Access EGU

- 2018 WMO Prof. Dr. Vilho Väisälä Award for an "Outstanding Research Paper on Instruments and Methods of Observation" was granted of this publication

Improved analysis of solar signals for differential reflectivity monitoring

Asko Huuskonen[1], Mikko Kurri[1], and Iwan Holleman[2]

[1]Finnish Meteorological Institute, Helsinki, Finland
[2]Radboud University, Faculty of Science, Nijmegen, the Netherlands

Correspondence to: Asko Huuskonen (asko.huuskonen@fmi.fi)

Received: 16 February 2016 – Published in Atmos. Meas. Tech. Discuss.: 22 F
Revised: 26 May 2016 – Accepted: 7 June 2016 – Published: 21 July 2016

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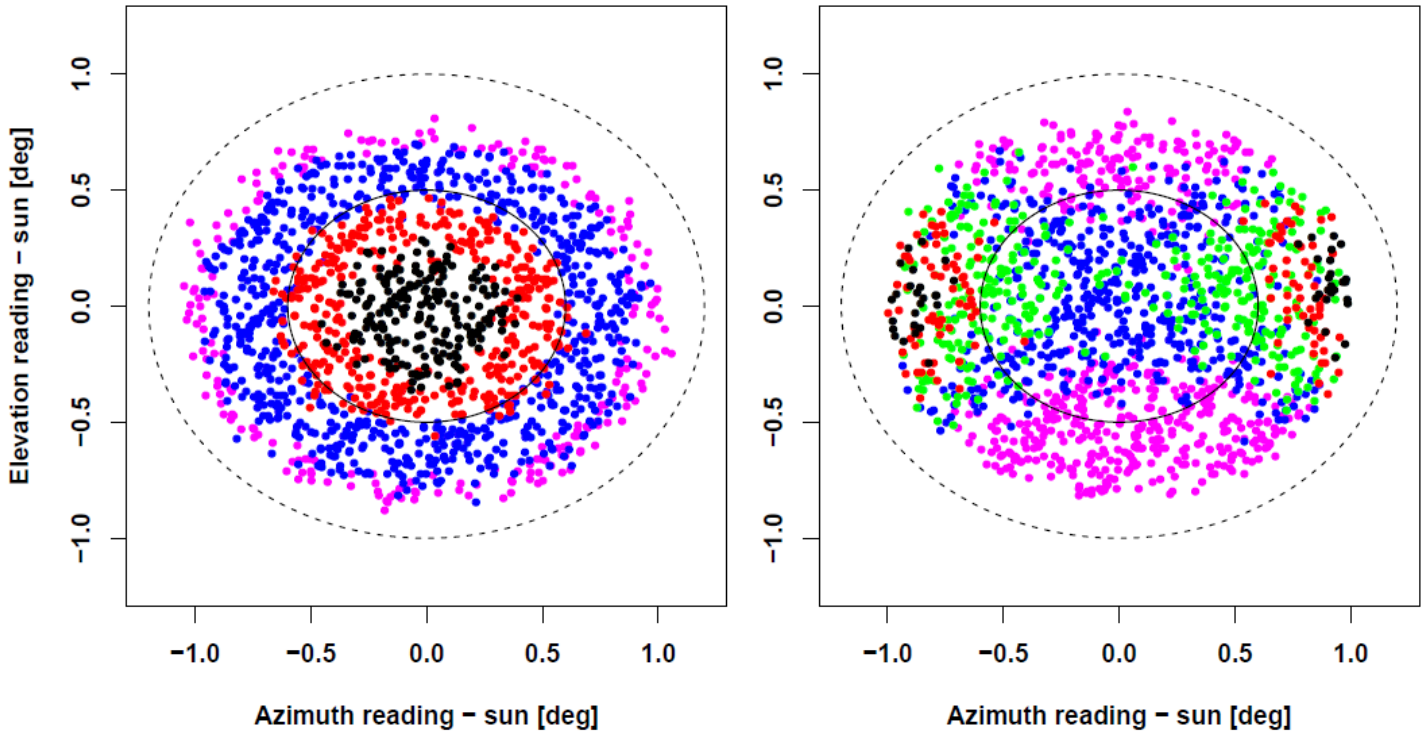
The Award
AMT 2016



- Improved quality control to mitigate e.g. rain and clutter contamination
- A number of analysis methods for solar ZDR (LDR) are presented
- Separate fitting the ZDR bias provides the pointing difference of the H and V polarization channels

Solar slowly varying component
Advances in Meteorology 2017

Hindawi
Advances in Meteorology
Article ID 4971765

Review Article

Evaluating the Solar Slowly Varying Component at C-Band Using Dual- and Single-Polarization Weather Radars in Europe

M. Gabella,[1] A. Huuskonen,[2] M. Sartori,[1] I. Holleman,[3] M. Boscacci,[1] and U. Germann[1]

[1]*MeteoSwiss, Locarno-Monti, Switzerland*
[2]*Finnish Meteorological Institute, Helsinki, Finland*
[3]*Faculty of Science, Radboud University, Nijmegen, Netherlands*

Correspondence should be addressed to M. Gabella; marco.gabella@meteoswiss.ch

Received 30 March 2017; Revised 11 August 2017; Accepted 23 August 2017

- Evaluation of C-band weather radar's ability to detect solar emission variations by using the solar monitoring technique

Solar monitoring in NEXRAD
JAOT 2021

- 9th paper from Iwan and Asko was accepted for publication!
- In this paper the solar monitoring method was applied to data of NEXRAD radar network in the USA

Solar Monitoring of the NEXRAD WSR-88D Network using Operational Scan Data

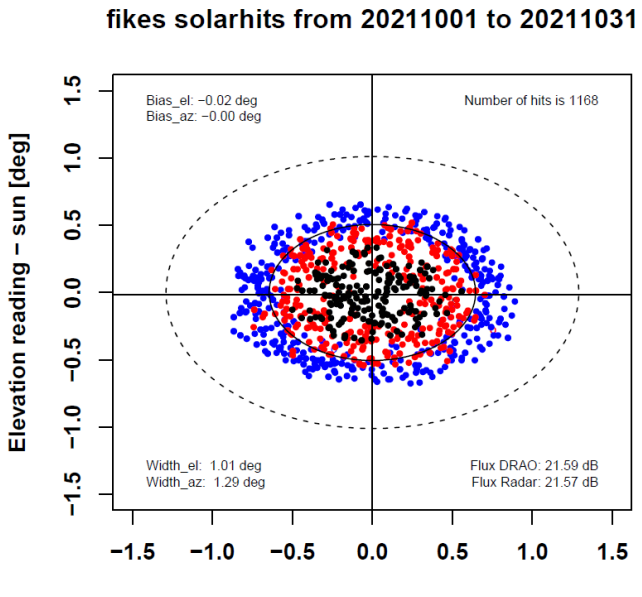
IWAN HOLLEMAN* AND ASKO HUUSKONEN† AND BRANDON TAYLOR‡

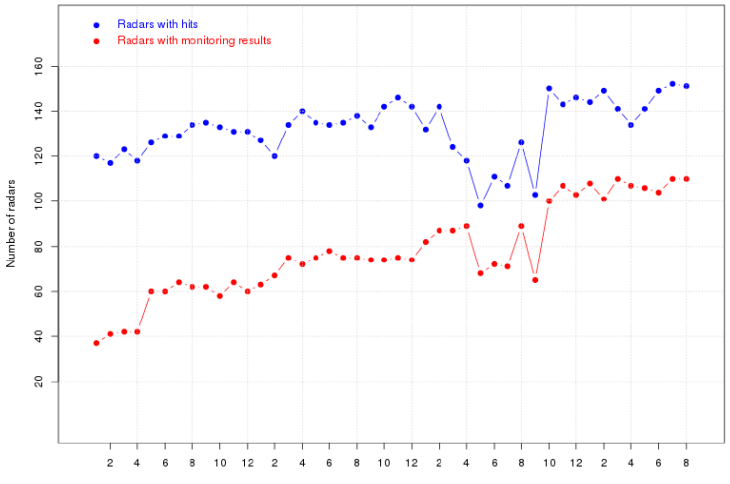
Radboud University, Nijmegen, Netherlands.

Journal of Atmospheric and Oceanic Technology, in press, 12 November 2021

Solar monitoring in OPERA

- Operational in OPERA
  - Solar hit detection module (2016)
  - Solar hit analysis software (2018)
- Monthly reports of
  - Time series and scatterplots from 148 radars in October 2021
- Plan is to have the hit detection and analysis in New production line (preliminary plan in 2022-23)
  - Unifying the two available codes (by Asko and Iwan)





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Asko is not anymore among us,

but he lives

in our minds, hearts and the algorithms he developed!