# The International Heliophysical Year (IHY) in Finland

*Finnish research related to IHY*

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## Geographical Perspective

The night-side auroral oval crosses Finland

## Participating Institutes

**Kumpula Space Centre, Helsinki (KSC)**
Finnish Meteorological Institute (FMI)
University of Helsinki, Dept. of Physical Sciences (UH)

**University of Turku (UTU)**
Department of Physics
Tuorla Observatory

**University of Oulu**
Department of Physical Sciences
Sodankylä Geophysical Observatory

## Historical perspective

**Helsinki Geomagnetic Observatory** 1844 – 1912:

- Visual observations of the three components of the magnetic field at 10 min (1844-1856), later 1 hour intervals.
- 12 students made the observations, working continuously (24/7) in 12-hour shifts.
- Part of an international network of some 20 observatories set up in a short time worldwide, marking the start of modern magnetic observations.
- Helsinki data together with the aa index forms the longest uniform measure of geomagnetic activity.

*J.J. Nervander (1805-1848) the first director of the observatory, later to be the Finnish Meteorological Institute*

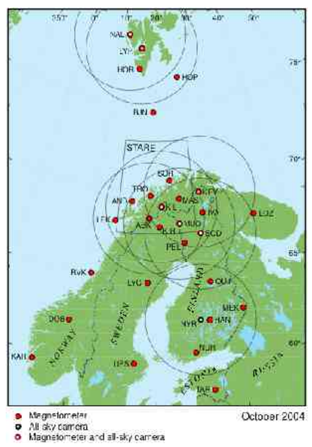
## IHY related activities

**Kumpula Space Centre**
- Magnetosphere-ionosphere coupling
- Planetary research
- Geomagnetism
- Aeronomy
- Solar and heliospheric physics
- Space weather
- Ground-based measurements

**University of Turku**
- Solar energetic particles
- Solar research

**University of Oulu**
- Ionospheric and auroral research
- Magnetospheric research
- Aeronomy
- Ground-based measurements
- Heliospheric research + cosmic rays
- Long-term studies: Space climate

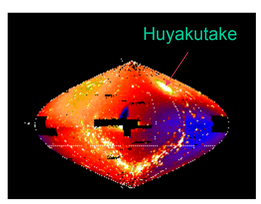
## Some experimental facilities



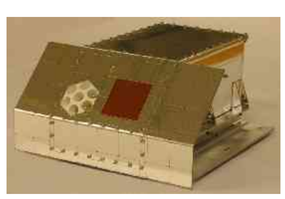

**MIRACLE Network** (FMI)
- Ground-based network of flux-gate magnetometers and all-sky cameras, covering more than 20° of latitude.
- Key element in the ESA Cluster ground-based collaboration

**Eperiments on-board SOHO**

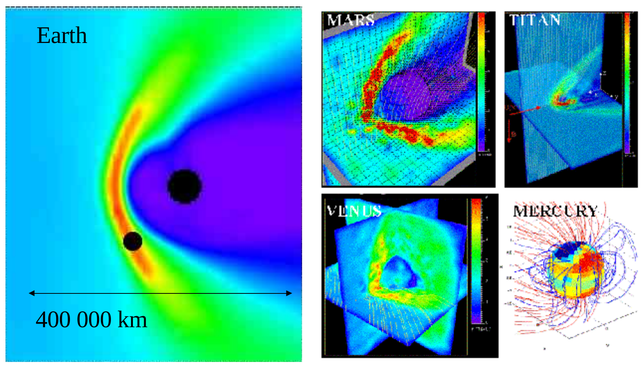
**SWAN (FMI)**
- Ly-alpha scattering on interstellar hydrogen
- Large-scale structure of the solar wind
- Cometary studies
- Far side solar activity




**ERNE (UTU)**
- Solar energetic particles
- Cosmic rays

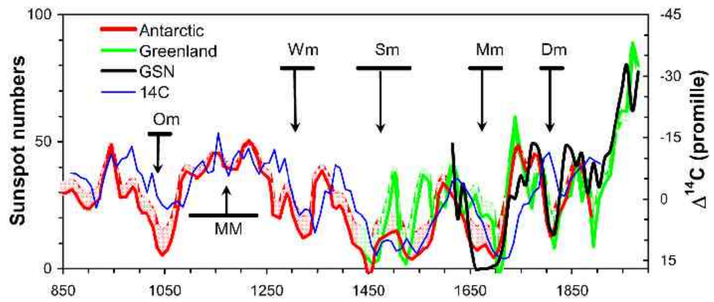


## Space plasma simulations (KSC)

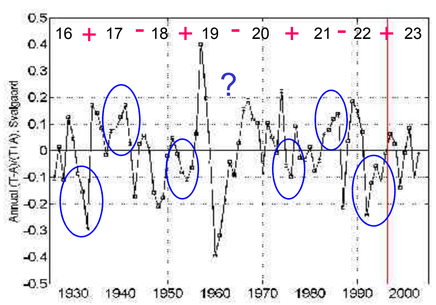



- Research on solar wind-magnetophere-ionosphere coupling
- Global MHD simulation code GUMICS-4
- Hybrid codes: Mars, Venus, Mercury, Titan
- Analysis of Mars Express, Venus Express and Cassini observations
- Monte-Carlo simulations energetic particle acceleration and transport in solar wind (with UTU)

## Long-term solar activity and heliospheric structure (Oulu)




- Physics based estimates of long-term solar activity from cosmogenic isotope masurements




**Bashful Ballerina**
- Heliospheric Current Sheet (HCS) is southward shifted in the declining/minimum phase of the solar cycle at least since 1920s
- During cycle 19 HCS experiences exceptionally large variations

WEBSITE: http://www.ihy2007.fi