

Present and future threats to global geomagnetic observation network & how we face them

H Toh

WDC for Geomagnetism, Kyoto

Contents

- What we discussed in Cape Town
- Lessons from Past & Present Threats
 - Example of GSI, Japan
 - What happened in Denmark?
 - What's going on in US?
- Some Key Questions to be Addressed in the Future

What we discussed in Cape Town at WG- level as well as Division-wide level



Topics Discussed II



- Bid for holding the XIXth IAGA Observatory Workshop in Kazan, Tatarstan, Russia, 2020
-> bid was accepted by unanimous vote
- Information regarding the state of USGS Geomagnetism Program
 - Initial presidential budget proposal eliminated Geomagnetism Program effective October 1st, 2017.
 - House of Representatives restored funding for the USGS Geomagnetism Program.
 - Senate and House must still agree on a final budget.
 - In the meantime, USGS Geomagnetism is continuing to operate
 - Longer-term status of budget and operations uncertain and degradation of data services and connected research possible
 - > a resolution was formulated and accepted by unanimous vote
(to be discussed in point 8 of agenda)

IAGA Division V Working Group V-OBS



6- USGS Geomagnetism Program situation



All WGs were very much concerned about the situation of USGS Geomagnetism Program:

- V-OBS formulated a Resolution,
- V-DAT underlined the important role of USGS observatories for derivation of geomagnetic indices and lists of remarkable events and underlined the existing V-OBS Resolution,
- V-MOD underlined the fact that, funding cut of USGS would jeopardize the construction of IGRF-13, & endorsed the forthcoming IAGA-level Resolution in this matter.

Please, do not hesitate to sign the [on-line petition](#) launched on [change.org](#) by E. Petrovsky, IAGA President, "Geomagnetism is not just about compass needles".

(From IAGA Division V Working Group V-OBS)

The International Association of Geomagnetism and Aeronomy (IAGA)

Considering

- the value of continuity in high-quality, ground-based magnetic observations to increase our knowledge of Earth dynamics and space weather,
- the importance of such observations and related research in monitoring, modeling and forecasting extreme space weather events that could potentially disrupt the world economy and cost billions of dollars,
- the critical importance of such observations in developing global reference models such as the International Geomagnetic Reference Field, used in navigation (airborne, marine), satellite orientation, directional drilling and numerous other applications,

Noting

- that the United States presidential budget for Fiscal Year 2018 has proposed to eliminate the USGS Geomagnetism program,
- that most countries with advanced economies support an observational, research-based geomagnetism program,

Urges

- the United States government to continue funding permanent, ground-based magnetic observations in the United States and its territories, as well as observation-based research in geomagnetism.

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<https://www.change.org/p/ken-calvert-usgs-funds-reduction>

change.org

Start a petition Browse Membership

USGS funds reduction

1K supporters

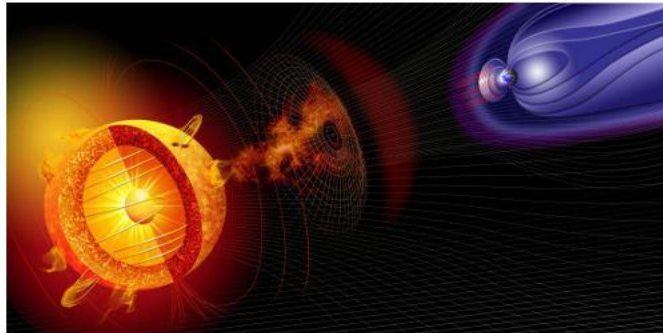
Petition details

Petitioning [Representative Ken Calvert](#) and [1 other](#)

USGS funds reduction



Eduard Petrovsky Prague, Czech Republic



Geomagnetism is not just about compass needles

The International Association of Geomagnetism and Aeronomy

Share this petition

1,197 supporters



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USGS funds reduction

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Resumption of Midway Magnetic Station

Toh¹, H., H. Shimizu², T. Minami² and M. Nosé¹

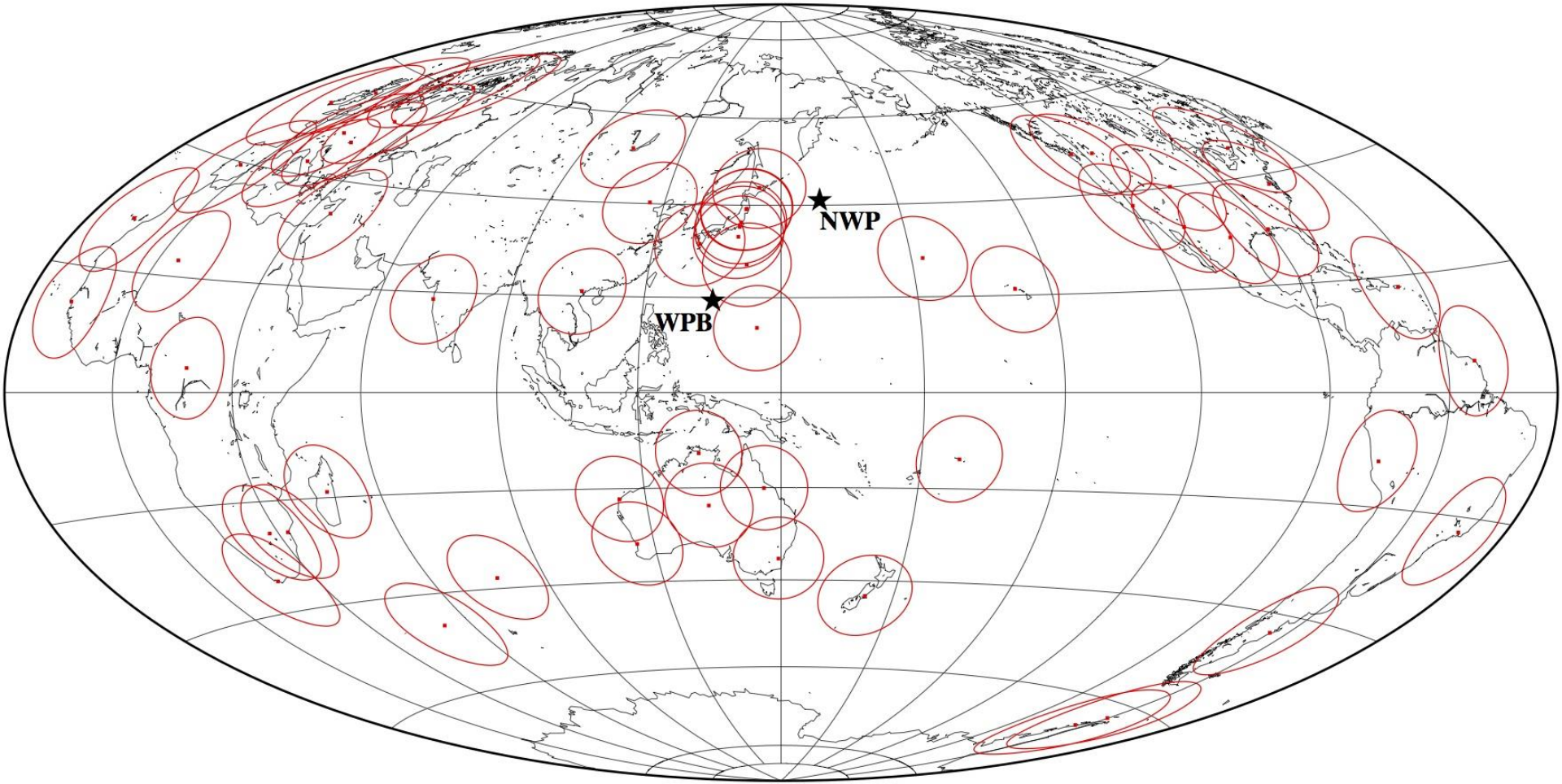
¹ *WDC for Geomagnetism, Kyoto University*

² *Earthquake Research Institute, University of Tokyo*



東京大学
THE UNIVERSITY OF TOKYO

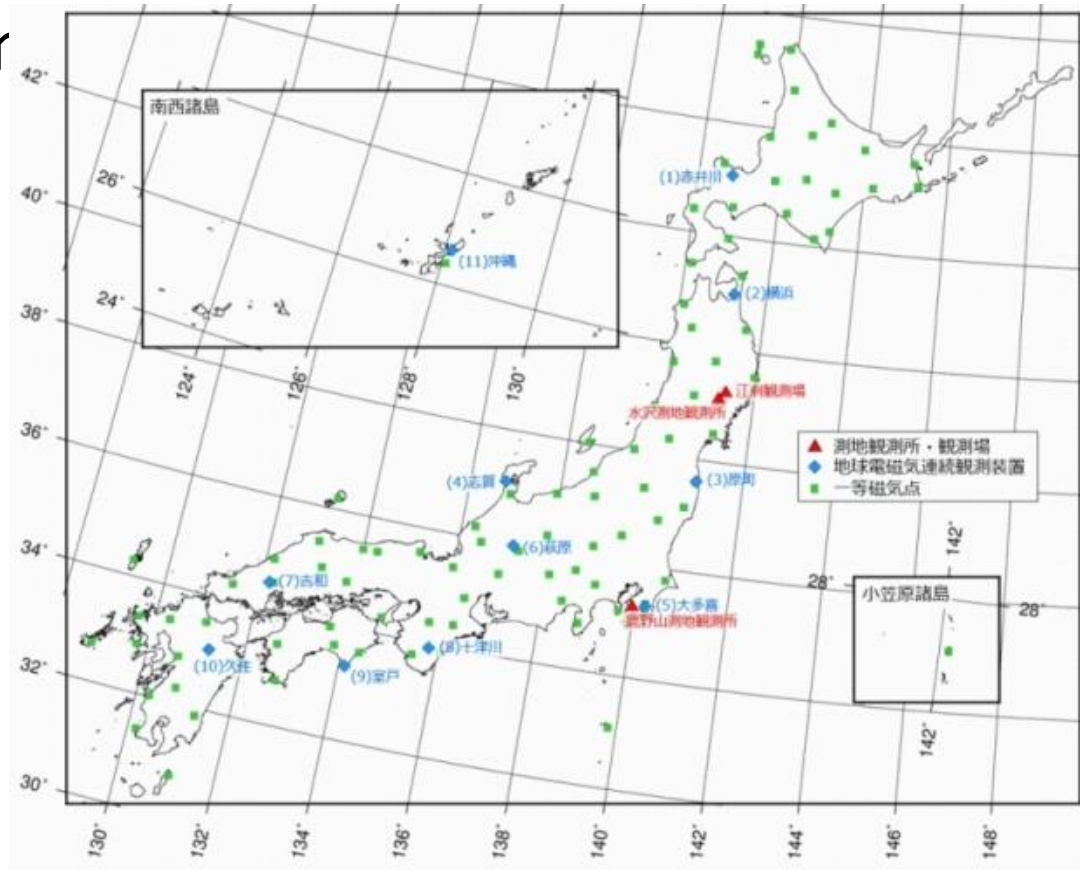
The Moderately Dense Network in East Asia



Japanese Experiences

- Geographical Survey Institute of Japan (now GeoSpatial Information Authority of Japan) faced a budget cut in early 2010s.
- WDC for Geomagnetism, Kyoto was consulted by the geomagnetic division of GSI for how to face that threat.

Ministry of Land, Infrastructure and Transport



Three GSI observatories (triangles) and 11 geomagnetic stations (diamonds)

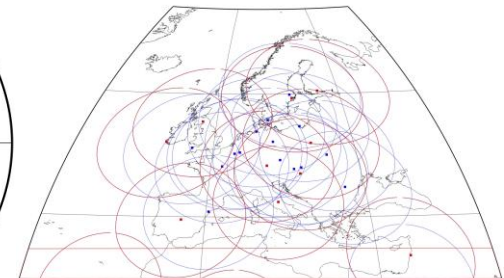
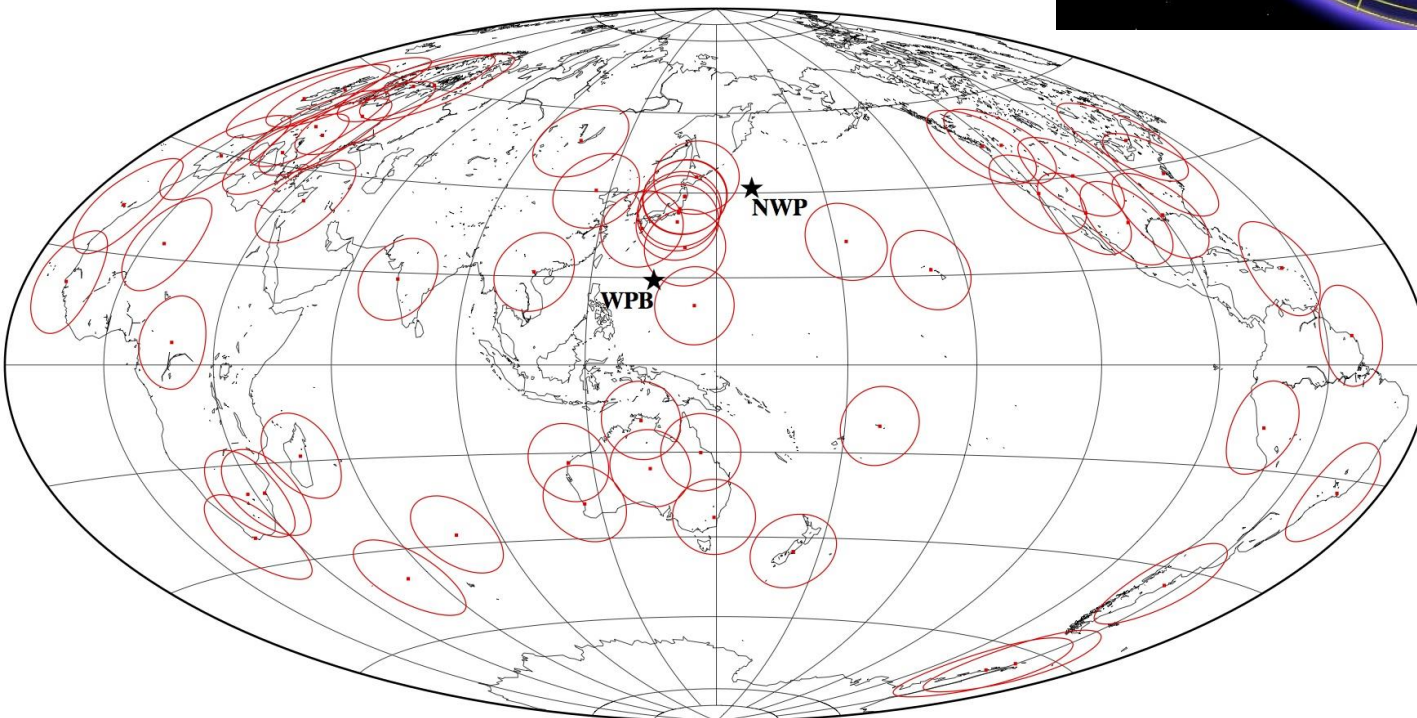
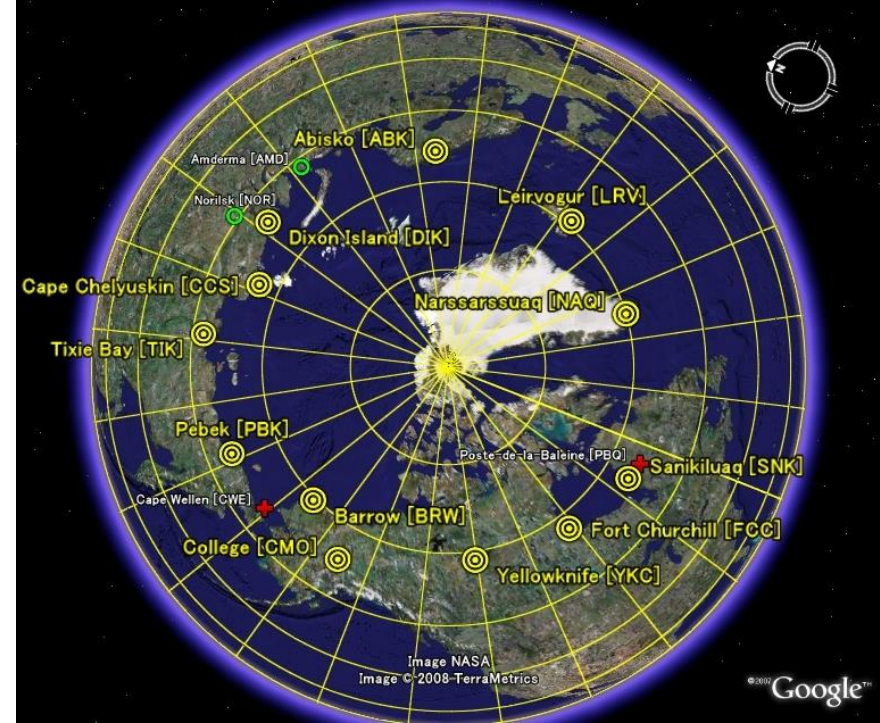
Numbers at both ends of runways



Seattle-Tacoma International Airport

Other Threats?

- USGS
- Danmark
- Anywhere else?



Some Key Questions

- Do we really need a global ground-based magnetic observatory network?
- What for?
- Isn't it enough to have magnetic constellation in space?
- How long are space weather/GICs kept alive as magic words ?
- How do we face the future threats?

Partial Answers

- We need geomagnetic observations both in space and on the ground to make the most use of the entire observation. Monitoring the static part of our planet's magnetic field may be done by small and cheap LEO satellites, while satellite constellations are necessary for R & D purposes.
- The ionospheric currents such as Sq currents can be identified well using data from two different altitudes.
- To estimate radial diffusion coefficients in radiation belt studies, the Intermagnet 1s data is definitely needed.