R&D Activities and Plans of Space Geodesy Group at KASI

Jungho Cho

Korea Astronomy and Space Science Institute

Space Geodesy at KASI

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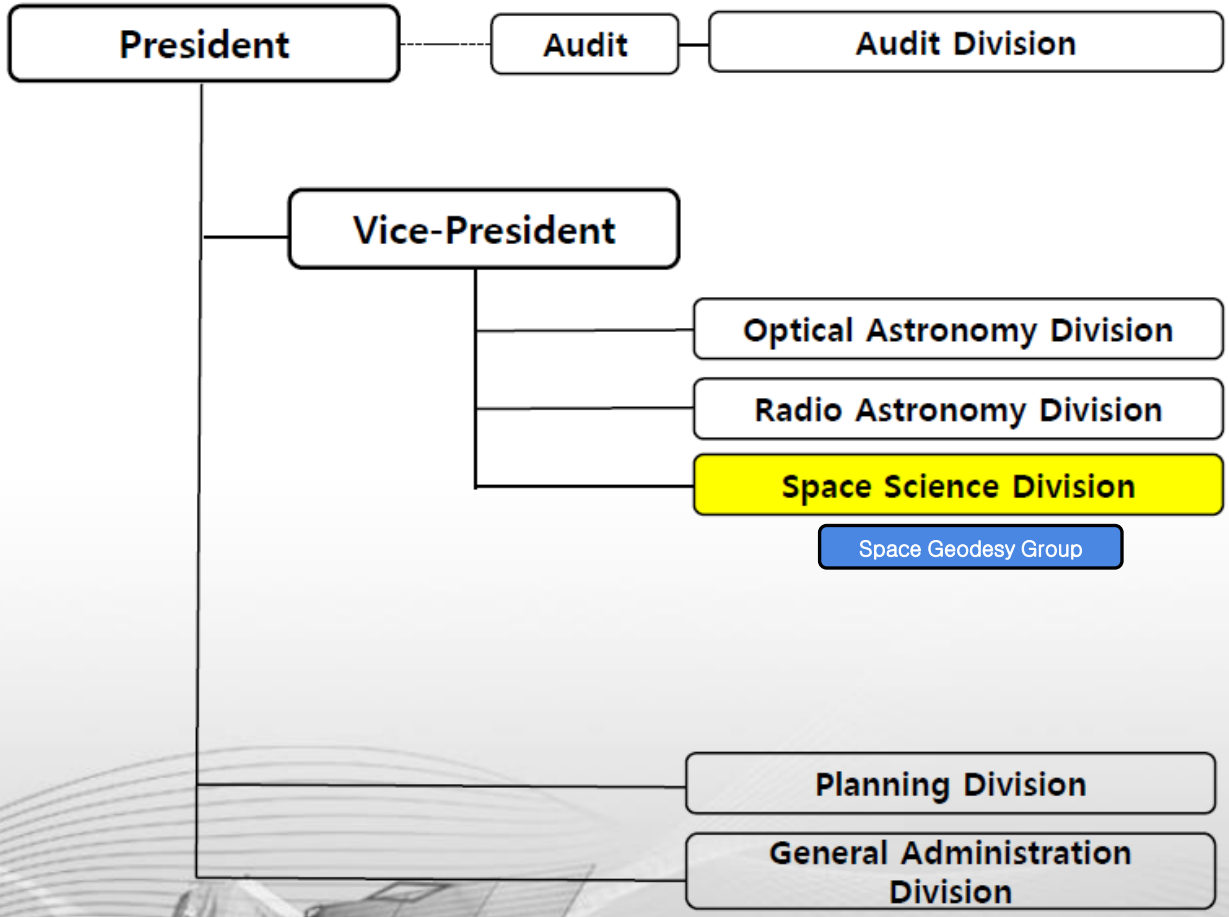
Organization



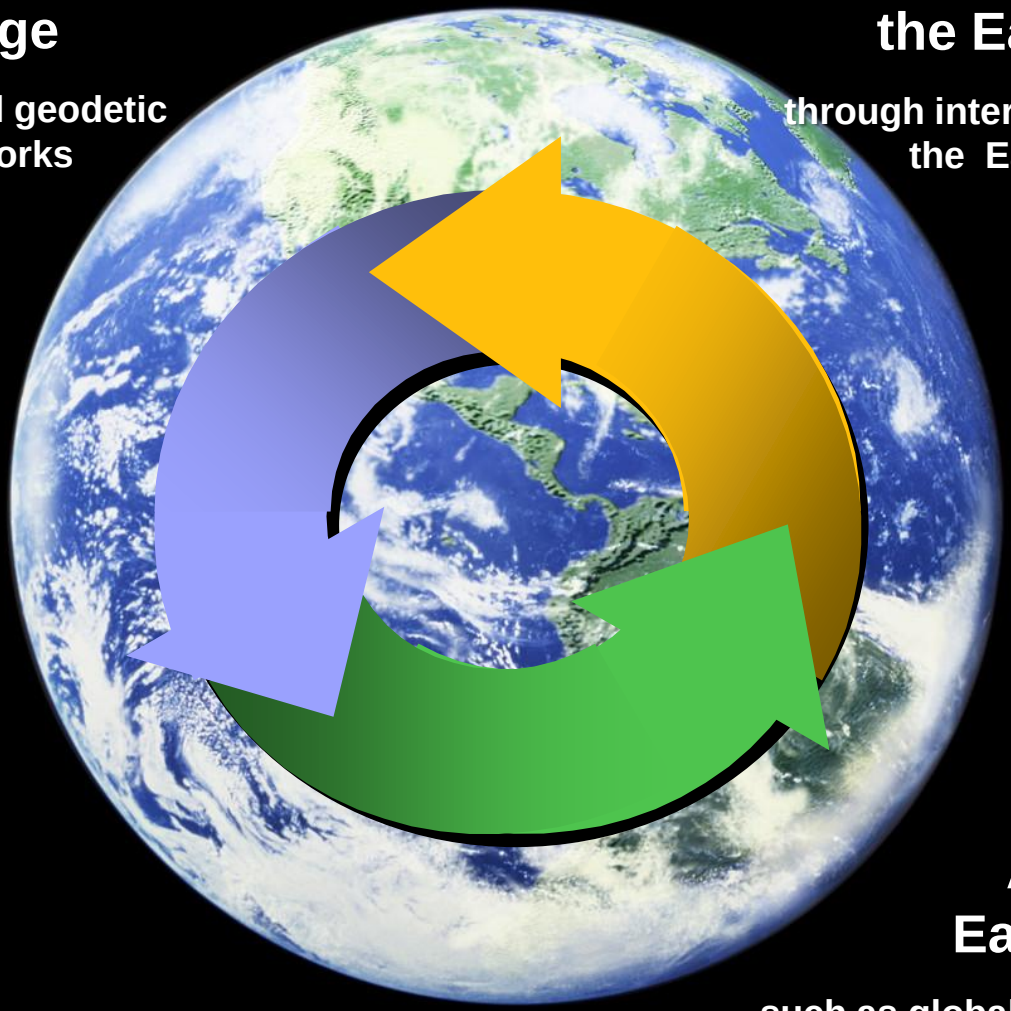
Space Geodesy

Monitoring of Earth change

based on global geodetic observing networks

Understanding the Earth system

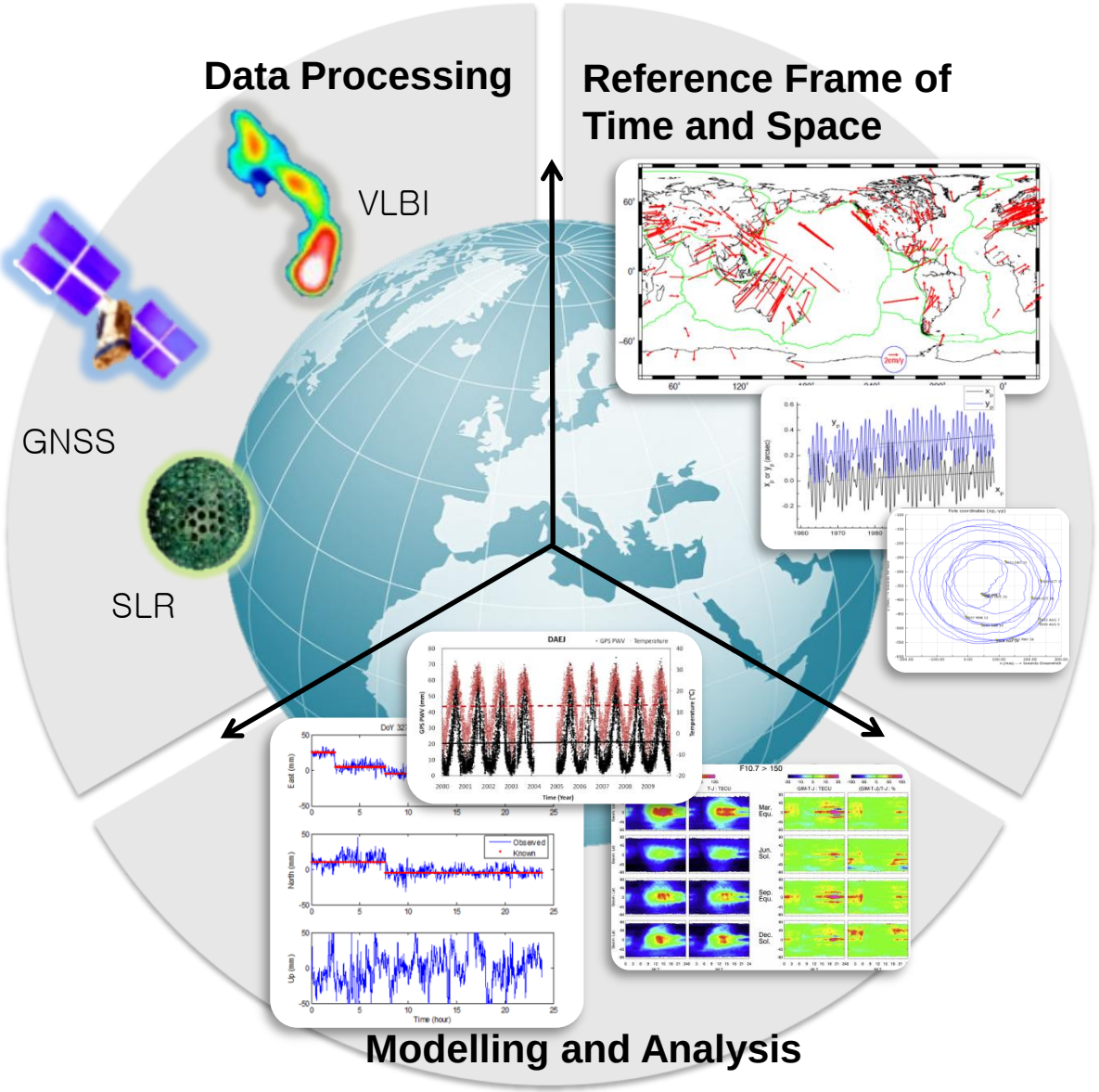
through interactions between the Earth subsystems



Analysis of Earth change

such as global changes of the Earth system and natural hazards

Space Geodesy of KASI



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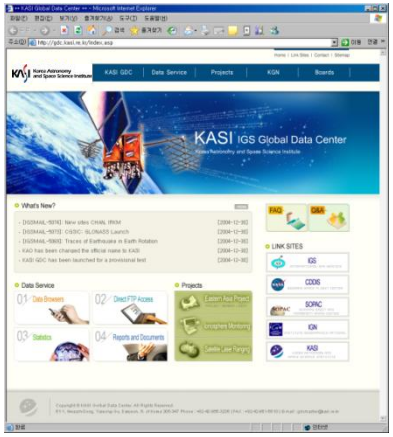
Infrastructure

The first GPS Campaign
IGS Global Station (TAEJ)
IGS Operational Data Center

TAEJ ➔ DAEJ



4th IGS
Global Data Center

1992 1995 1997 1999 2006 2008 2015

2nd IVS
Combination Center

IVS
International VLBI Service for Geodesy and Astrometry

Prof. Dr. Harald Schuh
Institute of Geodesy and Geophysics
TU Wien
Gusshausstr. 27-29
Dioseon 305-348
1040 Wien
AUSTRIA

October 21, 2008

Dr. Jeng-Uk Park
Korea Astronomy and Space Science Institute
61-1, Hwaam-dong, Yuseong-gu
Dioseon 305-348
SOUTH KOREA

Re: Proposal from Aug. 25, 2008 for KASI to become an IVS Combination Center

Dear Dr. Park,

On behalf of the IVS Directing Board I would like to thank you for your proposal that KASI become an IVS Combination Center. I am very pleased to inform you that the IVS Directing Board has unanimously accepted your proposal on the basis of the Terms of Reference (ToR). Thus, it is my pleasure to welcome KASI as a

Combination Center.

We thank you for your willingness to cooperate and we appreciate your important contributions.

We are convinced that the highly qualified team at KASI will generate excellent contributions. Please, let us know which KASI staff should be added to the list of IVS Associate Members. The IVS Analysis Coordinator, Axel Nothnagel, will contact you on specific aspects of your operations.

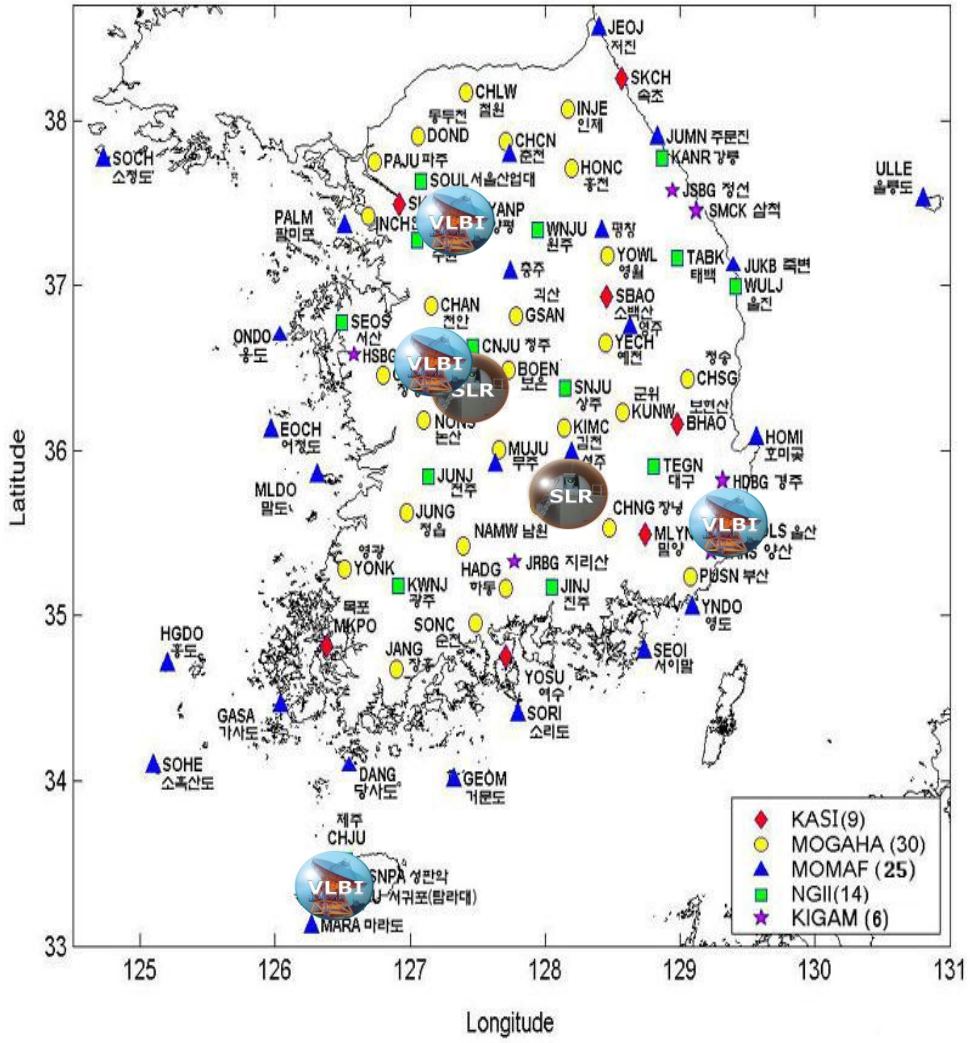
With kind regards

Prof. Dr. Harald Schuh
Chair

ILRS Station

KASI Korea Astronomy and Space Science Institute

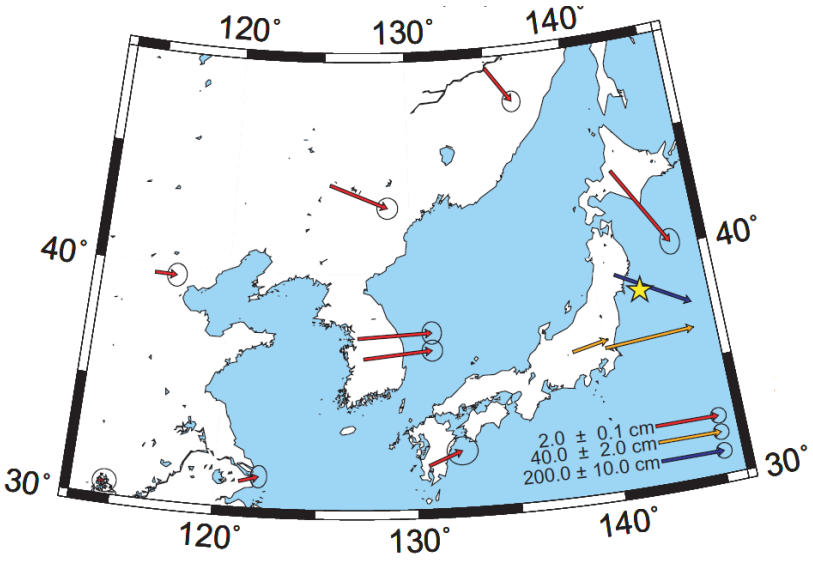
The Space Geodesy Network in Korea



- **GNSS (~150)**
  - **KASI (11)**
  - NGII (53)
  - NMPNT (31)
  - LX (30)
- **VLBI (4)**
  - **KASI (3)**
  - NGII (1)
- **SLR (2)**
  - **KASI (2)**

Research Areas

Crustal deformation



Monitoring of global plate motions using GNSS measurements from global and regional networks

Before the earthquake

After the earthquake

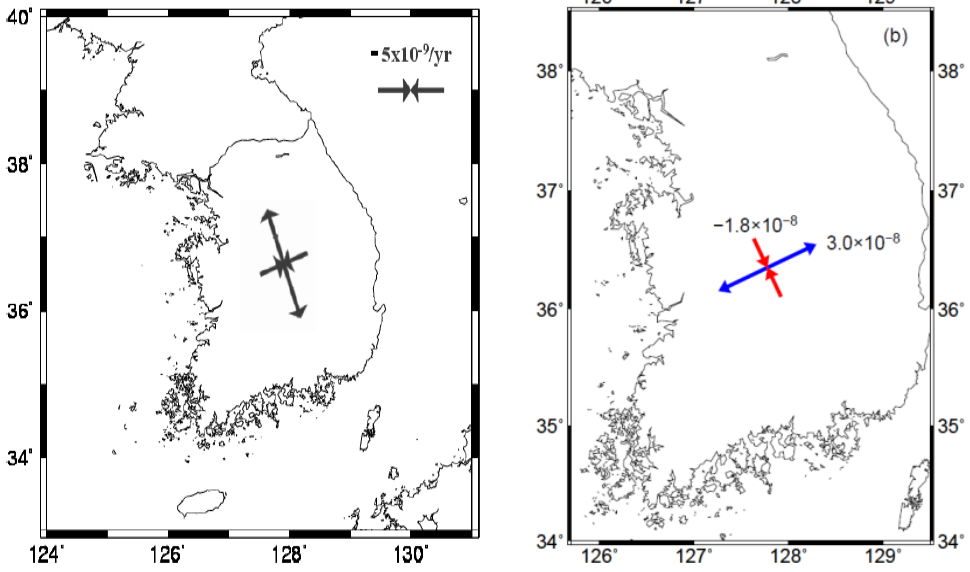
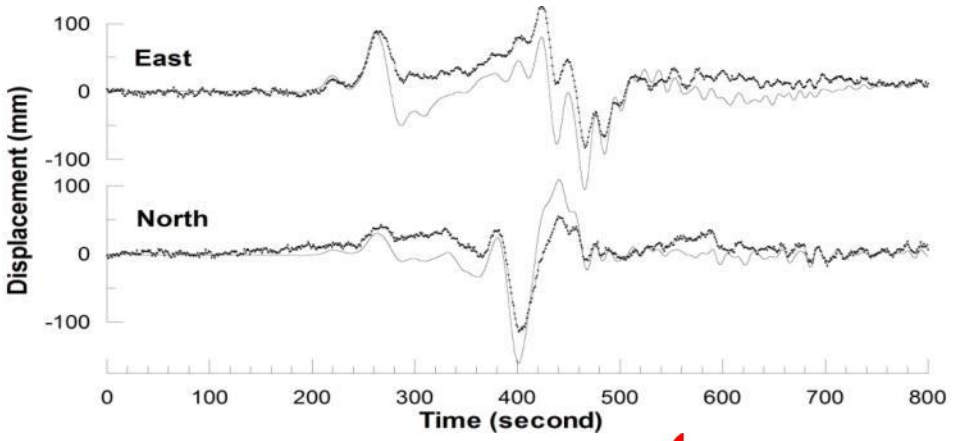


Fig. 4. The total principal strain rate in South Korea.



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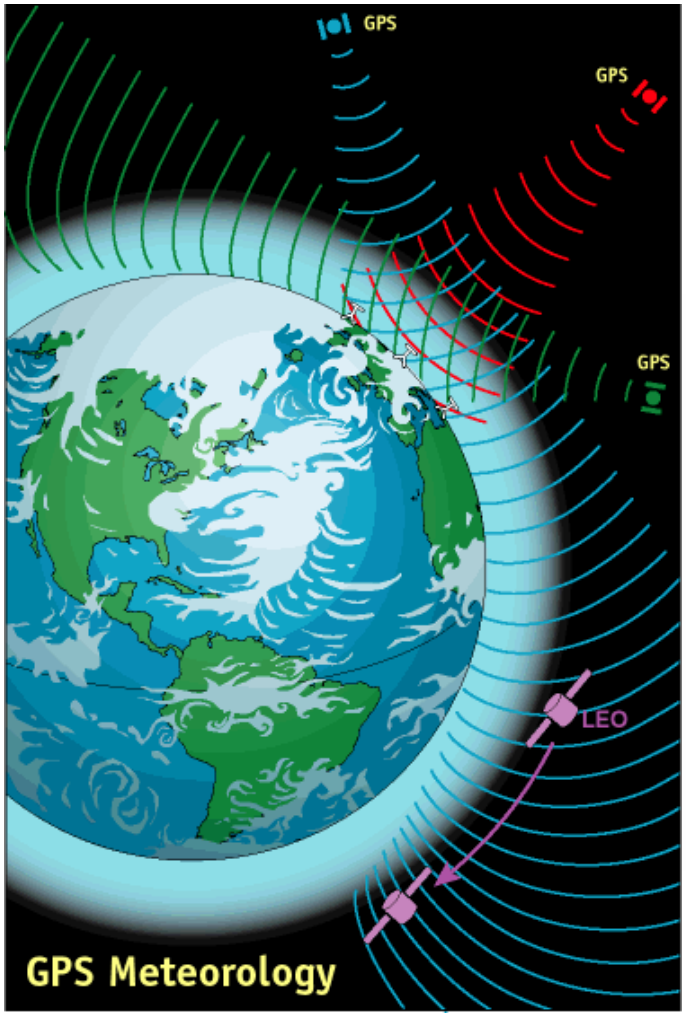
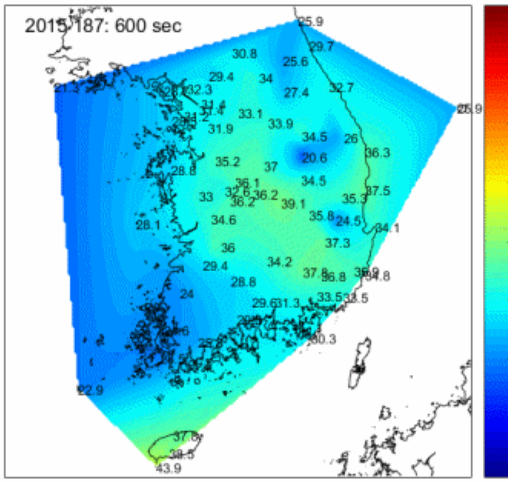
Research Areas

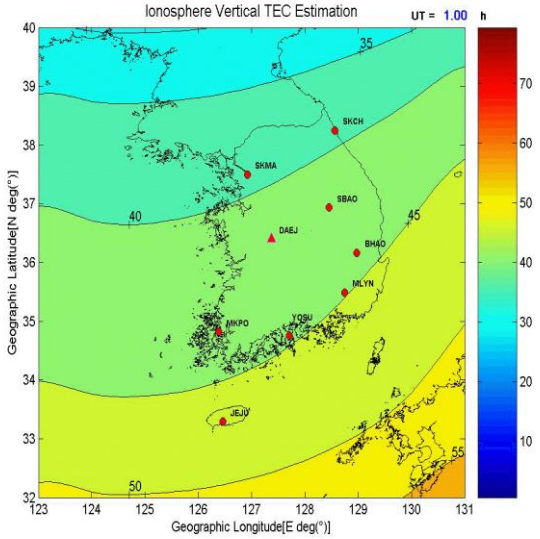
Monitoring of tropophere and ionosphere

: Ground & Satellite-based GNSS Obs.



Estimation of
tropospheric PWV and ionospheric TEC





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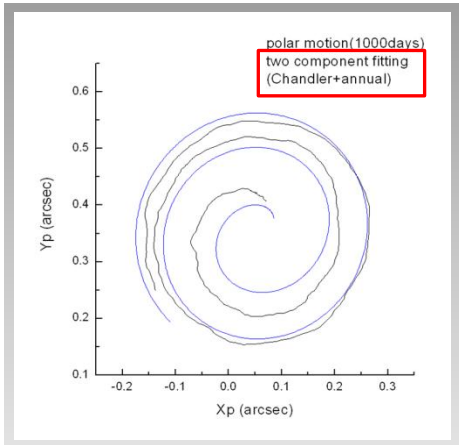
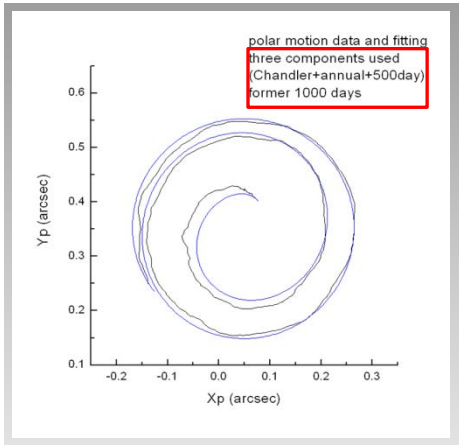
Research Areas

Reference Frame

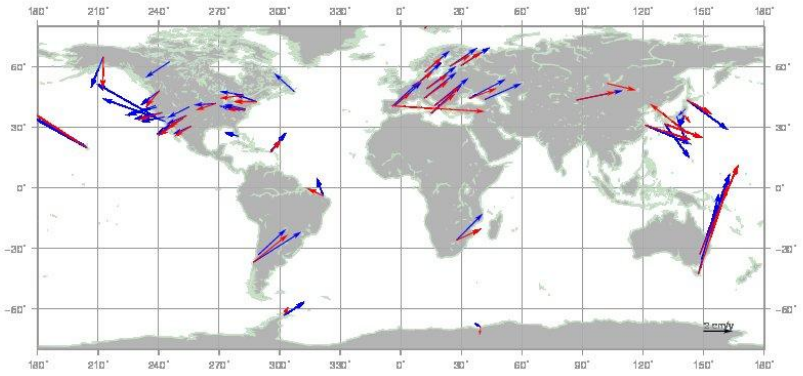
Determinations of reference frame of time and space have been conducted since 2007 based on core space geodetic techniques such as GNSS, VLBI, and SLR

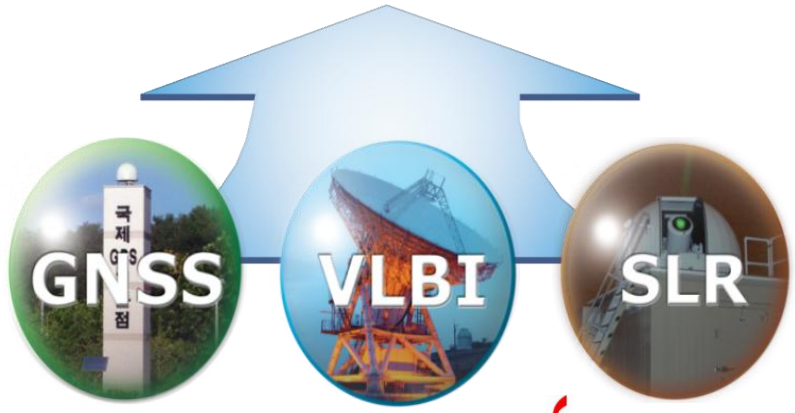
Earth Orientation Parameters





Polar motion predictions (blue solid lines) compared with conventional two components (left) and newly developed three components (right) w.r.t. observation (black solid lines)





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KASI's Vision for AOV

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KASI's vision for AOV

- **Organize a campaign for atmospheric variations for the region**

  : Periodic WV monitoring with VLBI, GNSS, MWR, RS, etc.

- **Contribute to determination of APREF**

  : Combined work with GNSS dominant APREF

- **Support KVN for K-band Astrometry**

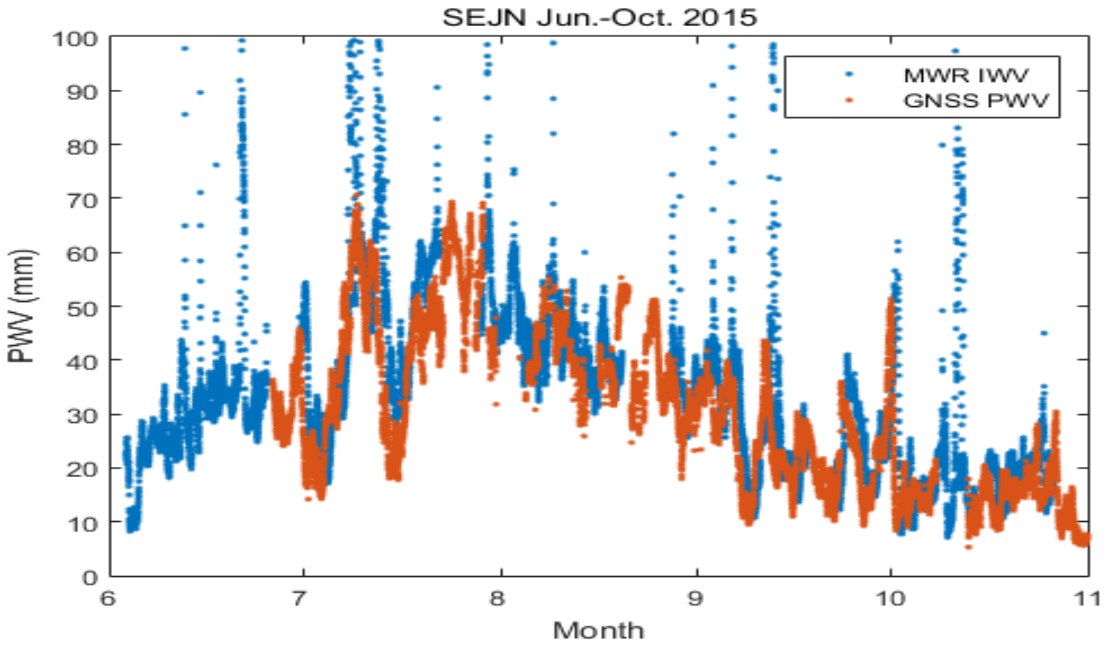
  : Fixed IVPs for three KVN telescopes

A possible campaign with AOV

- **Periodic WV monitoring with VLBI, GNSS, MWR, RS, etc.**

  for the atmospheric water vapor induced error correction

  to improve the vertical component repeatability



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A possible contribution of AOV

- **Update APREF based on GNSS & VLBI**
- **Most VLBI sites are located in the vicinity of GNSS monument**
- **Most recent news**

  UN General Assembly resolution: GGRF (February 26)

  GGOS Inter Agency Committee: ITRF & GGRF (June 26)

  GEO Strategic Plan 2016~2025: GD 07 program regarding GGRF (July 7-8)

  UN GGIM AP: WG on GGRF roadmap (October 5)

A possible collaboration with AOV

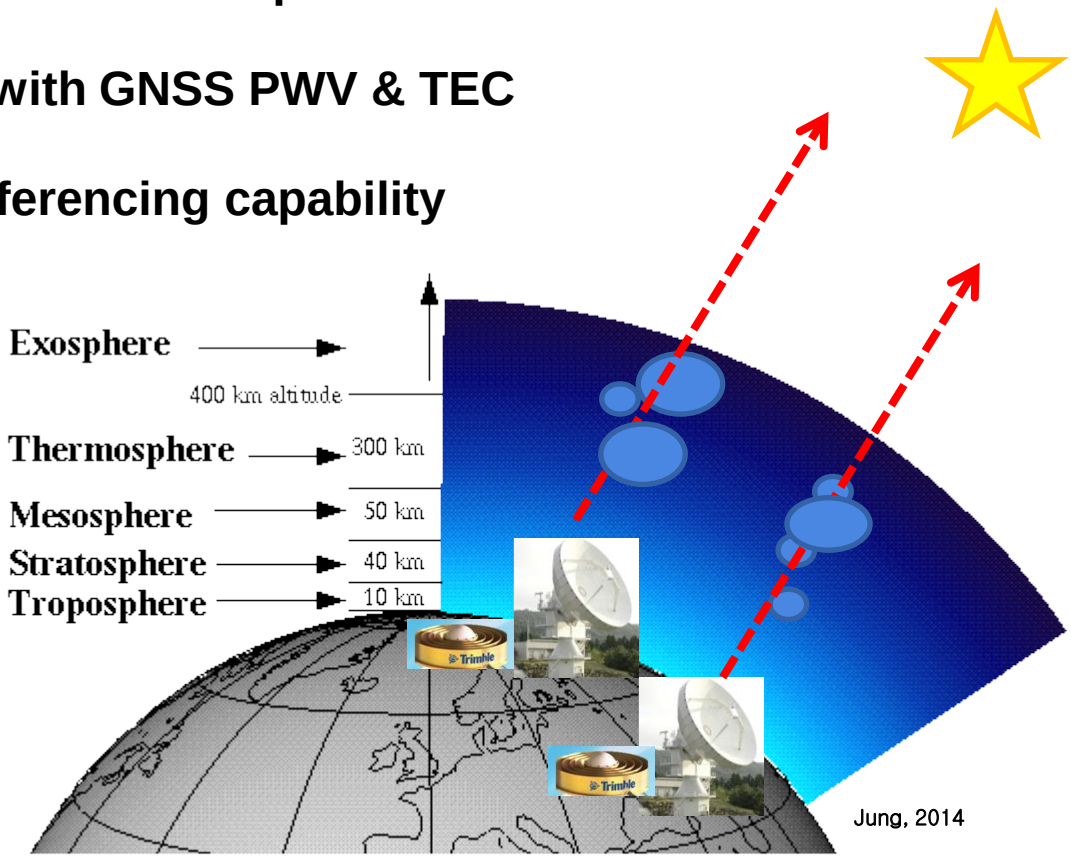
- **KVN In-Variant Point (IVP) Survey**

  : to monitor accurate KVN antenna position

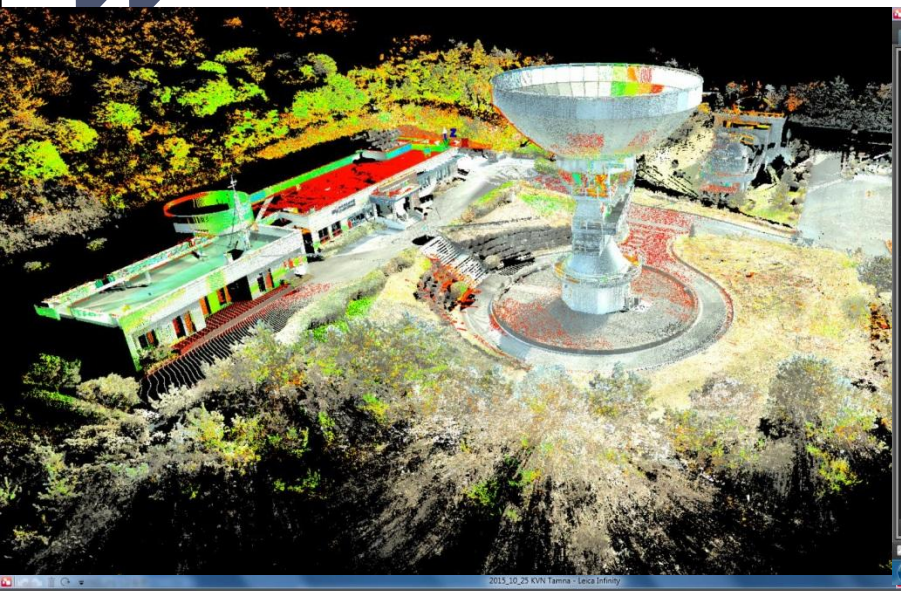
- **Atmospheric correction with GNSS PWV & TEC**

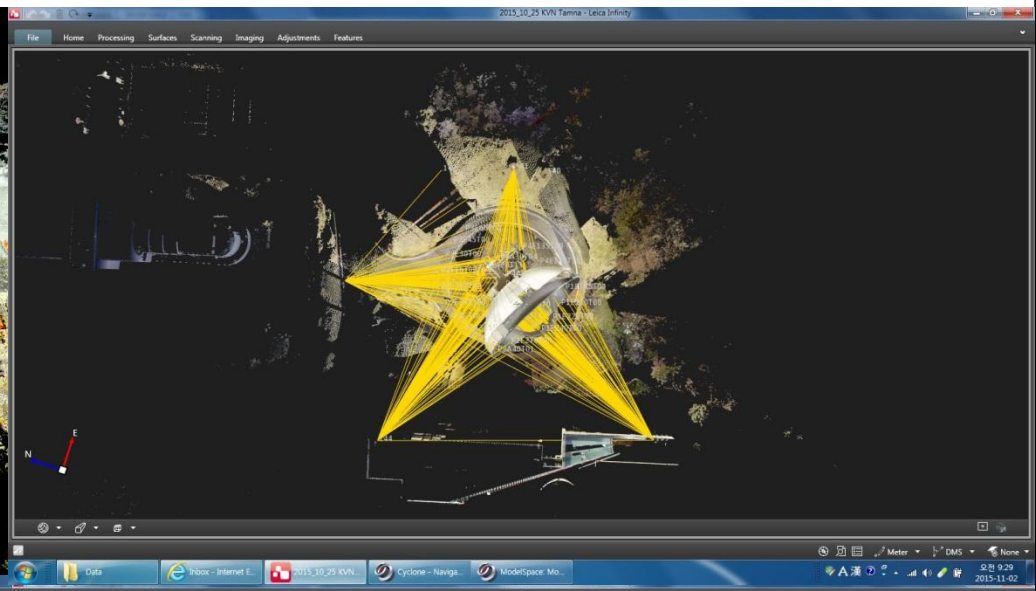
  : to improve a phase referencing capability

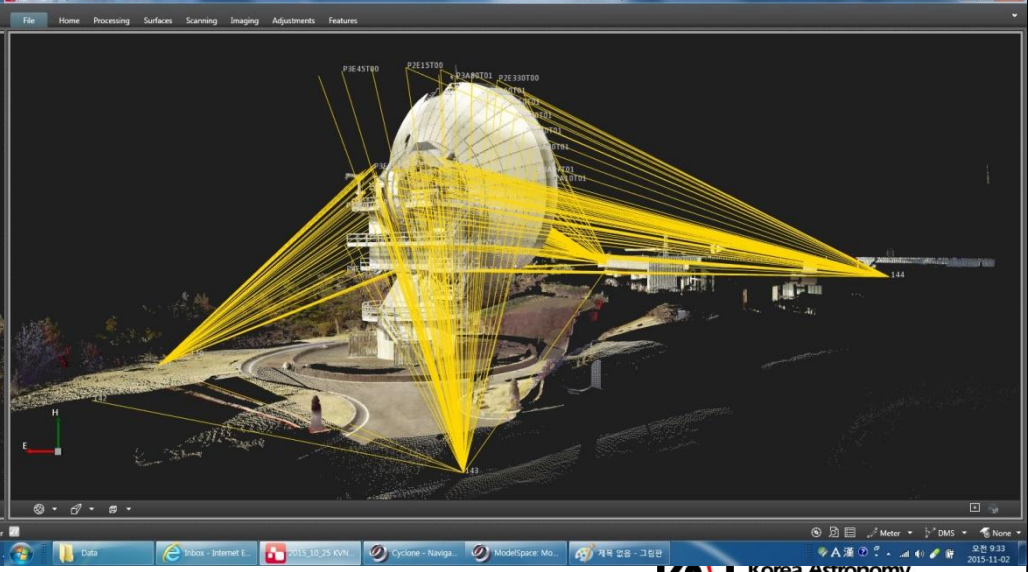
  & K-band Astrometry



IVP Survey on KVN Tamna

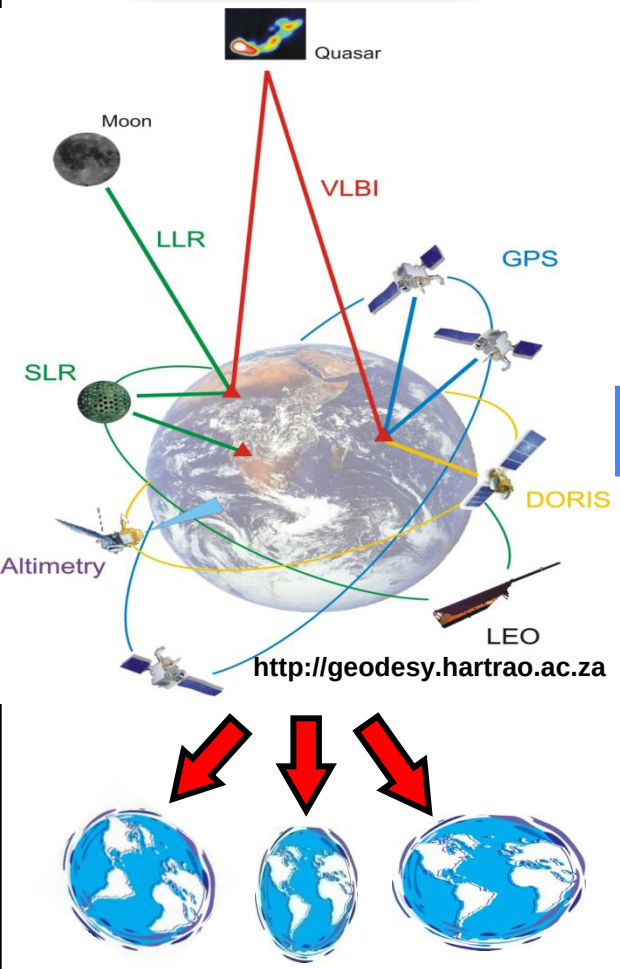




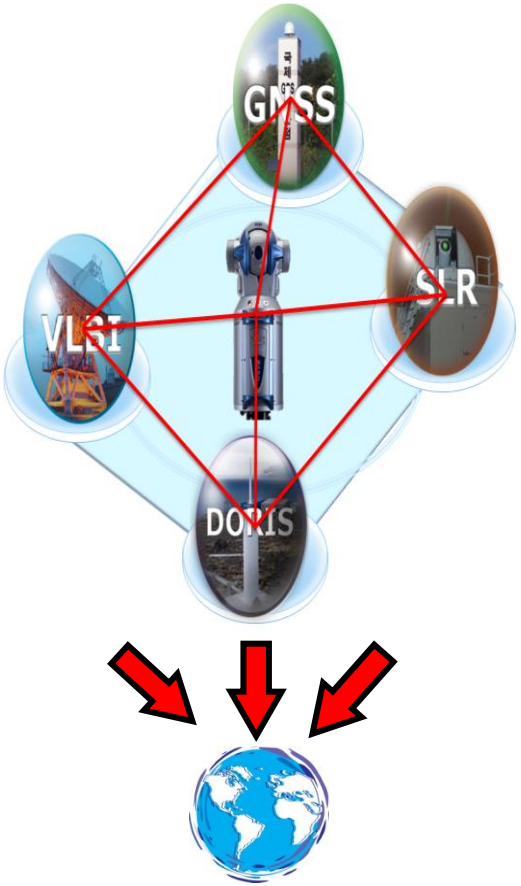


The Next Decade

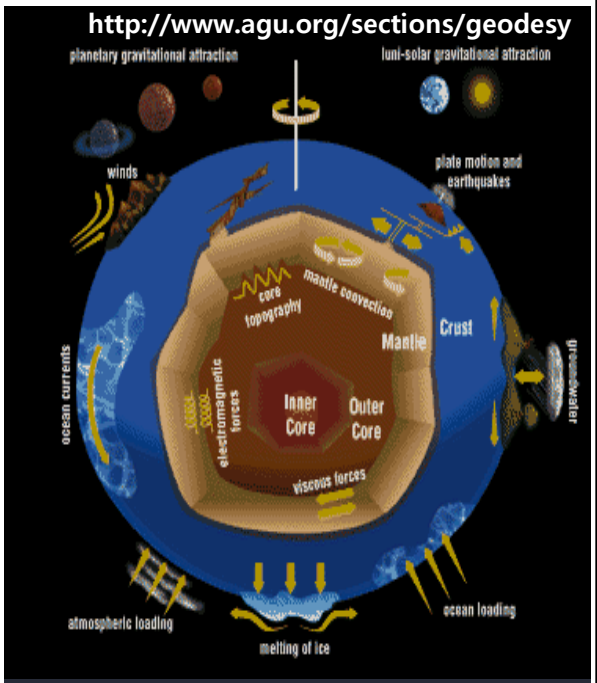
Problem



Key Solution



Key Science



- ✓ Reference frame (TRF/EOP)
- ✓ Monitoring of global changes of the Earth system and natural hazards
- ✓ Dynamic interaction between the Earth system

Thank you

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