Summary of the workshop

Mamoru Ishii

Agenda Item

- Lap-up of the Special session
  - Comments
  - Treatment of the metadata
- Business meeting
  - Next meeting
  - AOSWA link
  - Join as associate member of AOSWA

Lap-up of the special session

- “Omiai” meeting is a new style to create a new collaboration.
- Although there are several issue to be improved, (I believe) many people enjoy the meeting.
- Comments
  - Discussion time is too short
  - We need some additional slot which we discuss with preferable institutes.
  - It is very heavy to make combinations in advance. In addition, several institutes disappear and the counterparts lost their partners.
  - The expected merit of “Omiai” is to create a new collaboration with needs-seeds matching, but in addition that, it is another merit to meet institutes who does not talk each other in ordinal situation.

Treatment of metadata

- With preparing the “Omiai” session, we could get together the metadata of observation in each institute. They are precious information and (I believe that) they should be shared in appropriate meta database.
- On the assumption of agreement for open policy of these metadata from each institute, we would like to have discussion how we treat them. For example,
  - Build our own meta-database
  - Put them in some meta-database in present

Business meeting

- Next ASOWA workshop?

Function of AOSWA Secretariat

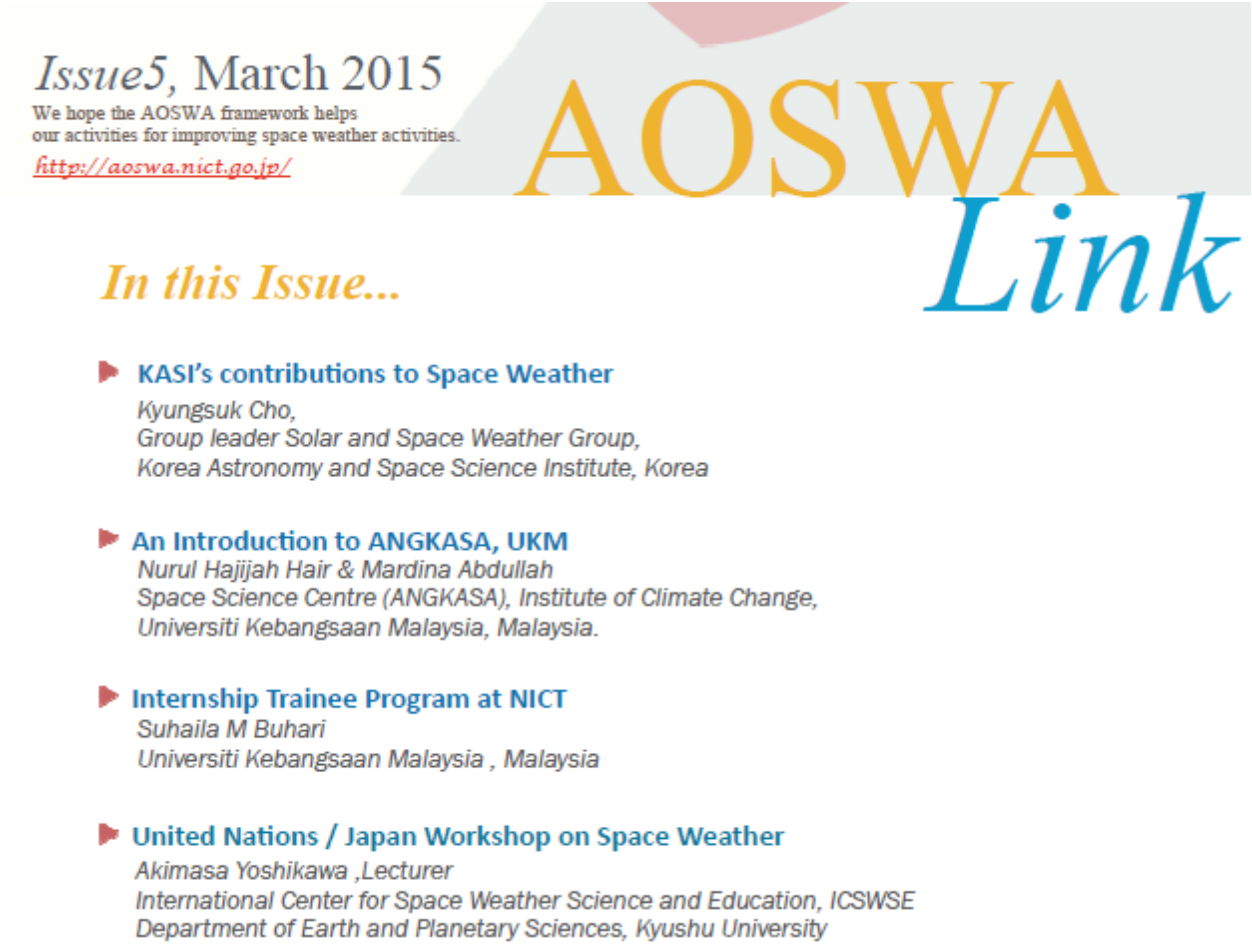
Web site: aoswa.nict.go.jp

Newsletter:AOSWALink

Mailing List

AOSWA@ml.nict.go.jp

AOSWA Link



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We hope the AOSWA framework helps
our activities for improving space weather activities.

http://aoswa.nict.go.jp/

AOSWA *Link*

In this Issue...

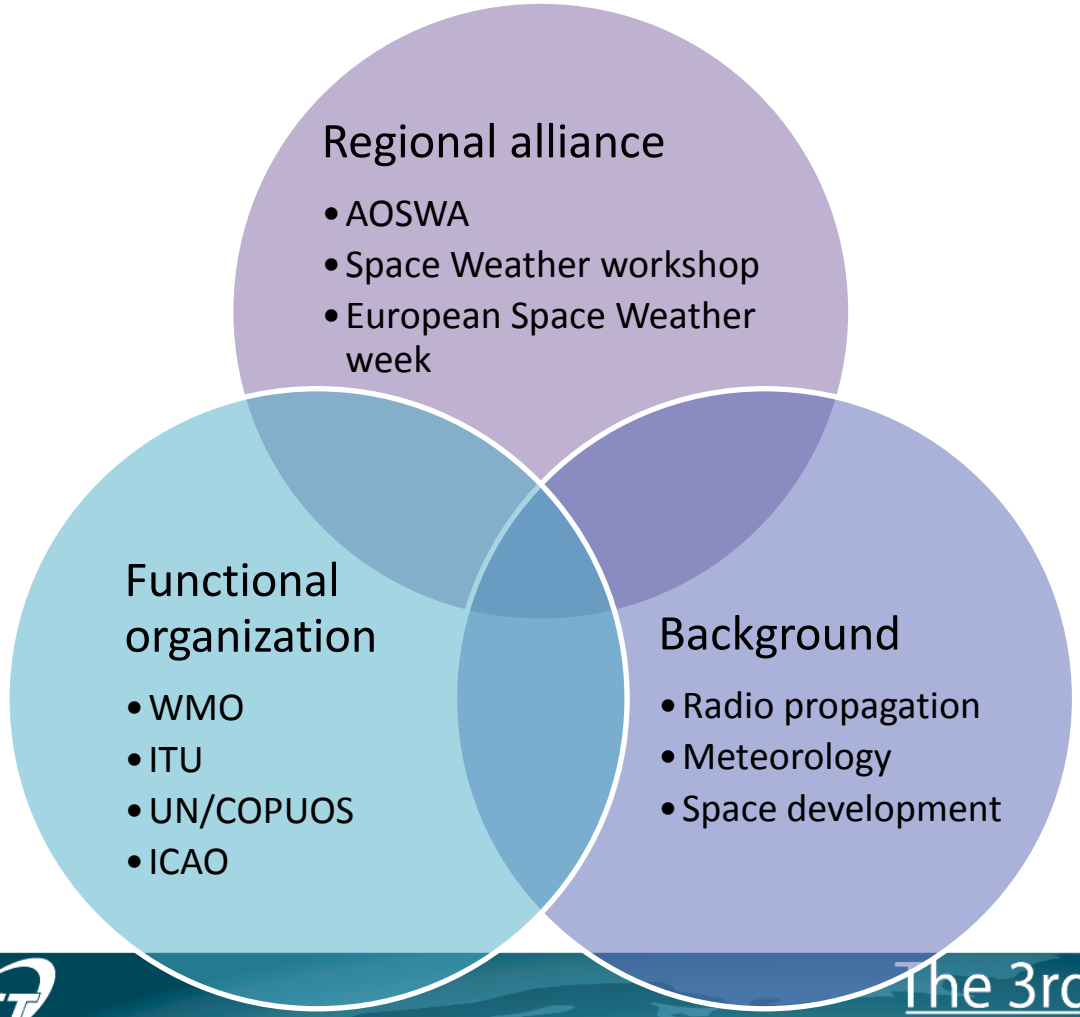
- **KASI's contributions to Space Weather**
  Kyungsuk Cho,
  Group leader Solar and Space Weather Group,
  Korea Astronomy and Space Science Institute, Korea
- **An Introduction to ANGKASA, UKM**
  Nurul Hajijah Hair & Mardina Abdullah
  Space Science Centre (ANGKASA), Institute of Climate Change,
  Universiti Kebangsaan Malaysia, Malaysia.
- **Internship Trainee Program at NICT**
  Suhaila M Buhari
  Universiti Kebangsaan Malaysia , Malaysia
- **United Nations / Japan Workshop on Space Weather**
  Akimasa Yoshikawa ,Lecturer
  International Center for Space Weather Science and Education, ICSWSE
  Department of Earth and Planetary Sciences, Kyushu University

Volunteers of article writers are needed!

AOSWA associates

- 26 institutes in 13 countries in present
- 75 people attended in AOSWA-3 Workshop from 14 countries (from other institute of AOSWA associates! Thanks!)
- We strongly recommend to join AOSWA associates.

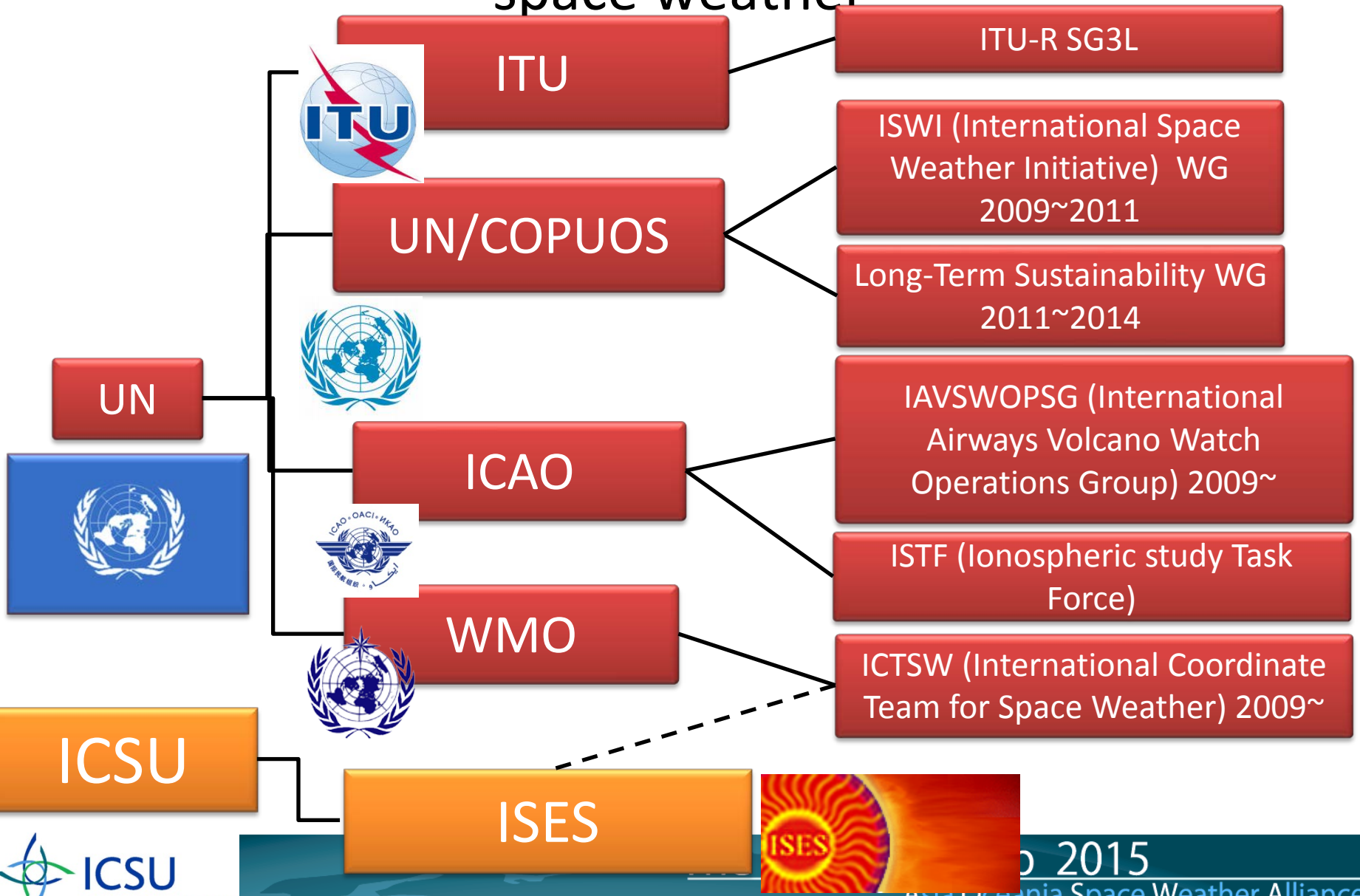
Cross section of space weather



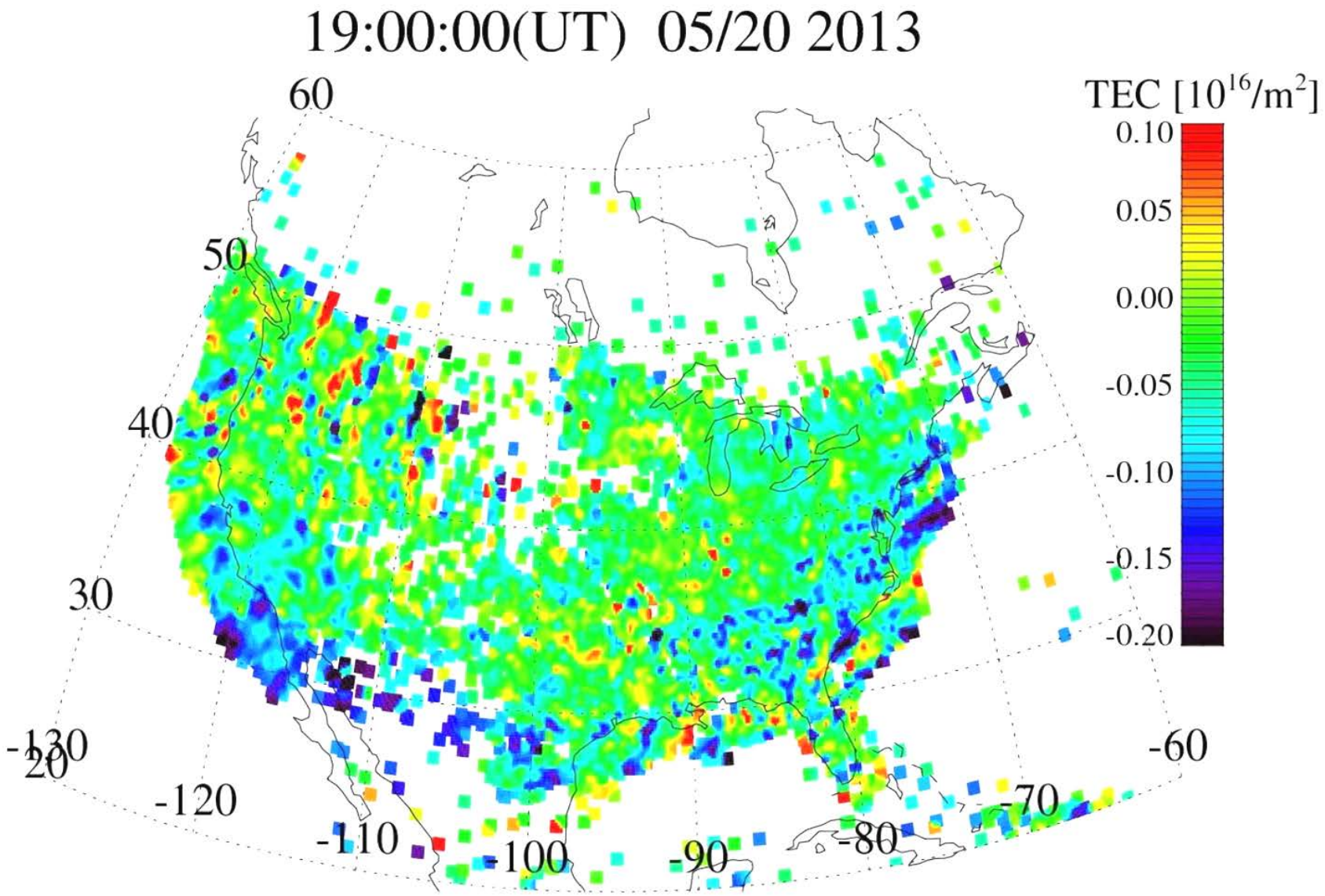
AOSWA should be a gate to international and functional organization

AOSWA should be a bridge among members which have different backgrounds

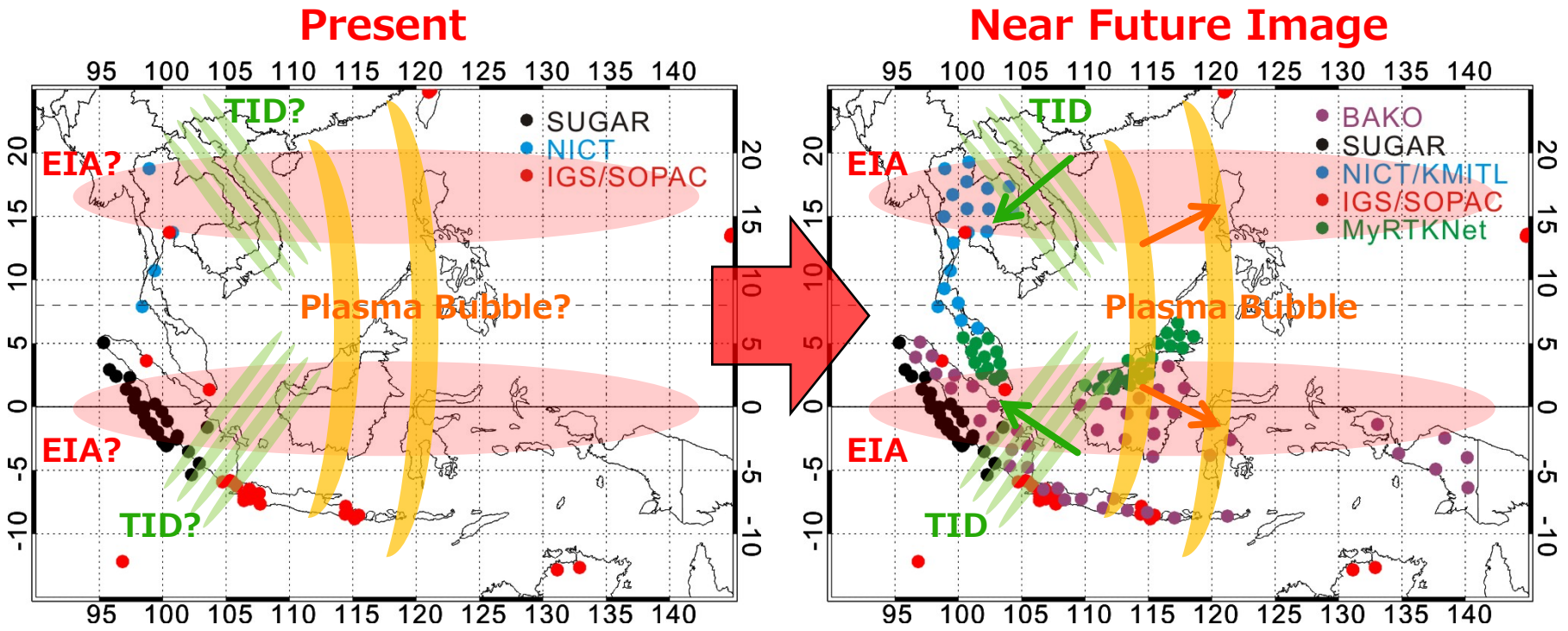
International organizations related to operational space weather



Ionospheric variations after massive tornados



Southeast Asian GNSS Networks Available for Ionospheric Researches



- The GPS-TEC maps greatly contribute to the ionospheric researches and the nowcast/forecast of space weather.
- However, it is difficult for a government and/or a data provider to provide the original GNSS receiver data abroad due to political and/or economic reasons because the raw data of GNSS receiver including multi-frequency carrier phase and psuedorange information are important and valuable

GPS Observation Data （RINEX ver.2 format)

```
     2.00           OBSERVATION DATA    G (GPS)             RINEX VERSION / TYPE

DAT2RIN 2.35x       GSI, JAPAN          09MAR02 16:13:17 GMTPGM / RUN BY / DATE
GSI, JAPAN          GEOGRAPHICAL SURVEY INSTITUTE, JAPAN    OBSERVER / AGENCY
440101351           TRIMBLE 5700        Nav 1.05 Sig 0.00   REC # / TYPE / VERS
                    TRM41249.00                             ANT # / TYPE
0001                                                        MARKER NAME
                                                            MARKER NUMBER
 -3522845.0167  2777141.5661  4518959.0276                 APPROX POSITION XYZ
        0.0000        0.0000        0.0000                 ANTENNA: DELTA H/E/N

     1     1                                                WAVELENGTH FACT L1/2

     4    L1    C1    L2    P2                             # / TYPES OF OBSERV
    30.0000                                                 INTERVAL
  2002     3     9     0     0    0.0000000     GPS         TIME OF FIRST OBS
HP-UX 10.20|PA-RISC|cc A.10.32.03|=+|=|                     COMMENT
***** RINEX HEADER SPECIFICATION 1.00 *****                 COMMENT
                                                            END OF HEADER
 02  3  9  0  0  0.0000000  0  9G 1G 2G 3G13G15G17G22G25G31
 -19012371.666    23282028.969   -14792202.9624   23282034.2034
 -20059488.864    22333773.945   -15610299.0404   22333776.2234
 -29405637.893    20488342.148   -22886235.5684   20488343.6844
 -10611214.715    23501437.734    -8249844.7244   23501441.9304
 -21574253.491    21813118.625   -16787240.0654   21813121.3794
 -19466956.219    22672753.922   -15147494.2964   22672757.9924
 -38120076.083    20147969.977   -29678594.7674   20147970.2814
 -34642202.746    23479338.891   -26972367.3494   23479343.8204
  -8256352.111    22876974.961    -6407292.0364   22876978.9264
 02  3  9  0  0 30.0000000  0  9G 1G 2G 3G13G15G17G22G25G31
 -18996599.842    23285030.305   -14779913.4304   23285036.4574
 -20169633.218    22312814.289   -15696125.7734   22312816.5204
```

Filename: ssssdddh.yyo
ssss: marker name
ddd: day of the year
h: file sequence number
yy: 2-digit year

Header Part

year, month, day, hour, min, sec, flag, # of PRNs, PRNs

1 epoch

- RINEX (Receiver Independent Exchange Format) is a *de facto* standard in exchanging GNSS observation data and potential users of GTEX would be familiar with RINEX.

GNSS-TEC exchange (GTEX) format (v1.0)

```
     1.0             GTEX DATA             GNSS                GTEX VERSION / TYPE
RNX2GTEX V1.0        NICT, JAPAN                               PGM / RUN BY
     0                                                         EXPONENT OF TECU
     TEC values in 10^16 el/m^2 (1 TEC Unit)                   COMMENT
     TEC Status Flag = 0 : Normal data                         COMMENT
                     = 1 : Lack of observables (TEC=999.)      COMMENT
                     = 2 : Too large TEC (TEC=999.)            COMMENT
                     = 4 : Cycle slip (TEC discontinuity)      COMMENT
                     = 5 : Cycle slip (LLI)                    COMMENT
                     = 6 : Beginning of arc                    COMMENT
     TYPES OF DATA   = R1 : Raw slant TEC including bias       COMMENT
                       A1 : Absolute slant TEC                 COMMENT
                            R1 or A1 is necessary              COMMENT
                       1F : TEC status flag                    COMMENT
                       1O : Observation data used for TEC      COMMENT
                       ZN : Satellite zenith angle             COMMENT
                       AZ : Satellite azimuth angle            COMMENT
                                                               BIAS ESTIMATION PGM
01321310.12o  01321320.12o  01321330.12o                       RINEX FILE NAME
0132                                                           MARKER NAME
00000               TPS NETG3           3.4 EG3 Jul,02,2010    REC # / TYPE / VERS
                    TRM29659.00     GSI                        ANT # / TYPE
 -3690821.3891  2897721.3097  4305504.4426                    APPROX POSITION XYZ
       42.7294       141.8640        0.0486                   POSITION LAT LON ALT
     6    L1    C1    L2    P2    S1    S2                    # / TYPES OF OBSERV
     5    R1    1F    1O    ZN    AZ                          # / TYPES OF DATA
    30.000                                                     INTERVAL
  2012    5     11     0     0    0.0000000     GPS           TIME OF FIRST OBS
                                                               END OF HEADER
 12  5 11  0  0  0.0000000  0  9G21G 9G18G15G28G 5G27G 8G26
 -61.7242  0  L1L2C1P2  32.45  194.42
 -33.4733  0  L1L2C1P2   9.32   14.04
 -49.7988  0  L1L2C1P2  20.39    9.03
 -55.8391  0  L1L2C1P2  83.27   39.34
 -43.6837  0  L1L2C1P2  32.21   44.21
 -38.7060  0  L1L2C1P2   8.31    3.34
 -44.8228  0  L1L2C1P2  74.42  265.99
 -31.3004  0  L1L2C1P2  23.01  343.20
 -48.7904  0  L1L2C1P2  50.12  115.79
 12  5 11  0  0 30.0000000  0  9G21G 9G18G15G28G 5G27G 8G26
```

Filename: ssssdddh.yy_TEC
ssss: marker name
ddd: day of the year
h: file sequence number
yy: 2-digit year

Header Part

RINEX files used to derive slant TEC

Rec. Position in Lat, Lon, Alt

Types of obs. in RINEX

Types of data product

Interval according to RINEX

year, month, day, hour, min, sec, flag, # of PRNs, PRNs

sTEC, TEC flag, Used RINEX observation data, sat. zenith angle, azimuth angle for PRN21

1 epoch