

TROPO Format

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Motivation for tropo format revision and standardization

- Tropospheric products are distributed using the SINEX_TRO format. It was prepared in March 1, 1997 only for IGS ACs needs. In November 2010 [refer to IGSMAIL-6298] SINEX_TRO format was slightly expanded to accommodate the addition of gradients. This expanded format has never been officially accepted/adopted.
- Due to the lack of standardization, different sw and organizations have started to use different field names for the same variables (e.g., STDDEV vs STDEV). Thus happened that the format cannot be transparently handled with a unique decoder.
- Missing various important meta data usually requires reading other special files along with the SINEX_TRO and conversions to other formats is not possible without additional information.
- Not all space geodetic techniques and derived tropospheric parameters can be fully supported (e.g. VLBI-derived parameters using different monumentations, tropospheric slant delay parameters, etc.).
- The format should aim to support general time-series for tropospheric and meteorological parameters estimated or derived from different solutions/sources. In this context, the format does not replace the RINEX_MET format designed for in situ meteorological observations.

Background

Different formats currently available for observed meteo data (Pressure; Temperature; Relative Humidity) and derived tropospheric parameters (Zenith Total Delay, Zenith Hydrostatic Delay; Zenith Wet Delay, Tropospheric Horizontal Gradients; etc.):

- RINEX_MET

<http://igscb.jpl.nasa.gov/igscb/data/format/rinex302.pdf>

- SINEX_TRO

http://igscb.jpl.nasa.gov/igscb/data/format/sinex_tropo.txt

- SINEX 2.02

http://www.iers.org/ IERS/EN/ Organization/ AnalysisCoordinator/ SinexFormat/sinex_cont.html

- COST-716

http://egvap.dmi.dk/support/formats/egvap_cost_v22.pdf

(afterward converted into BUFR format)

History

- November 2012 EUREF Retreat (Bern): issue raised
- October 2013 EUREF Fall TWG (Vienna): stimulate WG3 of COST Action to work on issue of SINEX_TRO format standardization
- April 2014: Format issue in WG3 work plan
- June 2014 IGS Workshop (Pasadena): draft proposal presented and discussed during the tropospheric splinter session. The IGS Tropo WG would support this initiative
- August 2014: draft proposal sent out to the IGS-TWG members, GNSS4SWEC WGx members, only a couple of feedbacks ☹
- October 2014: set-up a dedicated WG with people belonging to different IAG organizations and communities to freeze the draft proposal

We need:

- Support of techniques: GNSS, VLBI, DORIS, RS, WVR, NWP for format design and special products
- Support of different communities (EUREF TWG, IGS Tropo WG, IGS Infrastructure Committee, GNSS4SWEC, GRUAN, E-GVAP)
- Support of sw developers (BERNESE, GIPSY, GAMIT..)

IGS RINEX 3 transition plan and connection to E-GVAP

The RINEX 3 standard introduces **new station names and filename**

Field	Field Description	Example	Required	Comment/Example
<SITE/ STATION- MONUMENT/ RECEIVER/ COUNTRY/	XXXXMRCCC Where: XXXX - existing IGS station name M – monument or marker number (0-9) R – receiver number (0-9) CCC – ISO Country code (Total 9 characters)	ALGO00CAN	Yes	File name supports a maximum of 10 monuments at the same station and a maximum of 10 receivers per monument. Country codes follow : ISO 3166- <u>1 alpha-3</u>

COST Format V22a **station names**

2	Station Identifier, DOMES number, Full Name with country	4-character IGS-style ID (e.g. "ZIMM")	char	(A4,1X, A9,6X), 5X, A60
		9-character DOMES ID (e.g. "14001M004") Full site name with country name in brackets and/or <u>2-letter code</u> in square brackets (e.g. "Zimmerwald (Switzerland) [CH]")	char	

From the Transition Plan: ***'It is crucial that, to avoid any possible confusion, the new station names must be constructed centrally by the IGS CB.'***

Q: Is it applicable for stations belonging to private commercial network?

RINEX 3 File Name

File Name	Comments
ALGO00CAN_R_20121601000_01H_01S_MO.rnx	Mixed RINEX GNSS observation file containing 1 hour of data, with an observation every second.
ALGO00CAN_R_20121601000_15M_01S_GO.rnx	GPS RINEX observation file containing 15 minutes of data, with an observation every second.
ALGO00CAN_R_20121601000_01H_05Z_MO.rnx	Mixed RINEX GNSS observation file containing 1 hour of data, with 5 observations per second.
ALGO00CAN_R_20121601000_01D_30S_GO.rnx	GPS RINEX observation file containing 1 day of data, with an observation every 30 seconds.
ALGO00CAN_R_20121601000_01D_30S_MO.rnx	Mixed RINEX GNSS observation file containing 1 day of data, with an observation every 30 seconds.
ALGO00CAN_R_20121600000_01D_GN.rnx	RINEX GPS navigation file, containing one days data.
ALGO00CAN_R_20121600000_15M_RN.rnx	RINEX GLONASS navigation file, containing one days data

RINEX 3 Tropo Files

```
From this;
+TROP/SOLUTION
*SITE EPOCH_____ TROTOT STDEV TGNTOT STDEV TGETOT STDEV
MAS1 13:150:00000 2539.4 2.8 -3.106 0.407 0.059 0.474
...
Using filename;
mas1150.13zpd

To this;
+TROP/SOLUTION
*SITE EPOCH_____ TROTOT STDEV TGNTOT STDEV TGETOT STDEV
MAS100ESP 13:150:00000 2539.4 2.8 -3.106 0.407 0.059 0.474
...
To using filename;
MAS100ESP150.13zpd
```

This filename mirrors the IGS case

- No indication of the AC-ID in it
- Tropo products stored 'by station' on Data Centers
- Only 1-day allowed
- Good for time series analysis

It is not applicable for EUREF tropo products where at least 3 ACs are processing the same station and the EUREF official products is a combined solution.

Suggestion:

- Allow 4-digits to AC-ID in the proposed file name
- Not drop the old file name convention for multiple stations processed by the same AC ex. ASI18006.TRO otherwise too many files to download to do the combination !!!