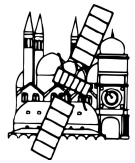
Università di Padova

CISAS G. COLOMBO



UPA LAC activities

A. Caporali, A. Nardo

LAC Workshop

15-16 March

Padova

History and target

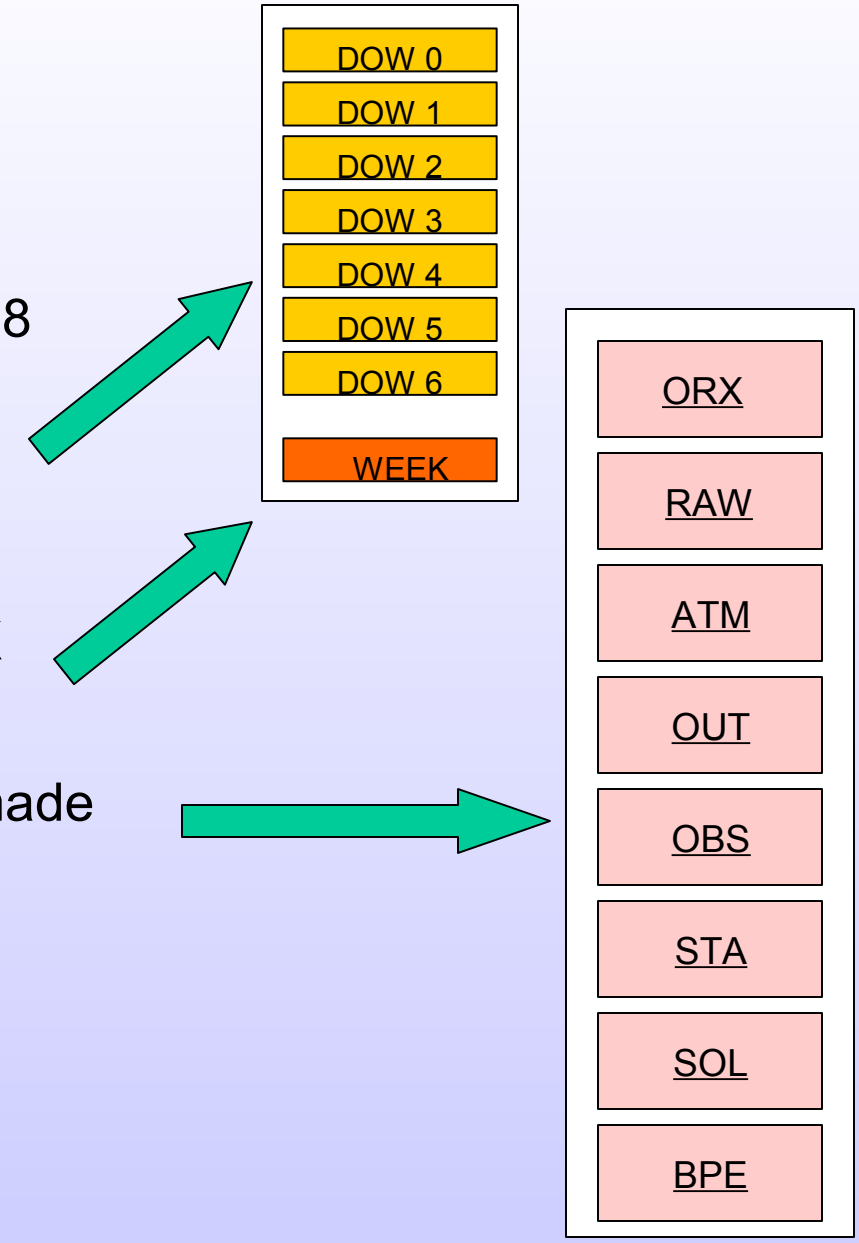
The UPA Local Analysis Centre (UPA LAC) is one of the two EUREF local LACs placed in Italy. As LAC, its principal target is to process GPS data coming from a subset of GPS EUREF stations. Its activities started in 1997 and have been increasing until now, both in the hardware and software employed and in the number of people involved. UPA LAC belongs to University of Padova through the Center for Space Studies and Activities (CISAS) "*G. Colombo*". The people involved in data processing operate the PADO EUREF station, too, whose antenna is placed on the roof of CISAS.

The main target is to provide reliable meta-data to EUREF; these meta-data are related to coordinate (SINEX), tropospheric correction (.TRP files) and statistics about the amount of raw data (.SUM).

UPA LAC data flux

Weekly campaign structure

- Each weekly campaign is made of 8 subdirectories.
- Daily solutions are stored in **DOW** subdirectories.
- Weekly solution is stored in **WEEK** subdirectory.
- Daily and weekly campaigns are made of 8 subdirectories



UPA LAC data flux

General files

- Campaign setup is done via a perl script which creates directory tree.
- General purpose files (SATELLIT., SAT_YYYY.CRX, .DCB files) are updated every week.

Raw data

- RINEX daily files (30 sec.) are downloaded into ORX subdirectory.
- Each file is decompressed by using Gzip and Hatanaka algorithm (crz2rnx).
- Each RINEX file is quality checked by TEQC. The first and last 30 seconds of data are removed by TEQC by trimming each RINEX file.

UPA LAC data flux

Orbits

- IGS .SP3 precise orbits: igs(wwww)(ddd).sp3.Z

Pole files

- IGS(wwww)7.ERP.Z

A priori files

- **EURF00.CRD:** a priori coordinates file, extracted from EUREF sinex.
- **EURF00.VEL:** velocities file, computed by NUVEL1A model.
- **EURF00.STA:** edited by hand when it is necessary.
- **EURF00.BLQ:** downloaded from EPNCB (ftp://epncb.oma.be/pub/station/general/OC_LOAD.BLQ).
- **EURF00.ABB:** abbreviation table, generated by PPP PCF file.
- **EURF00.FIX:** list of fiducial stations.

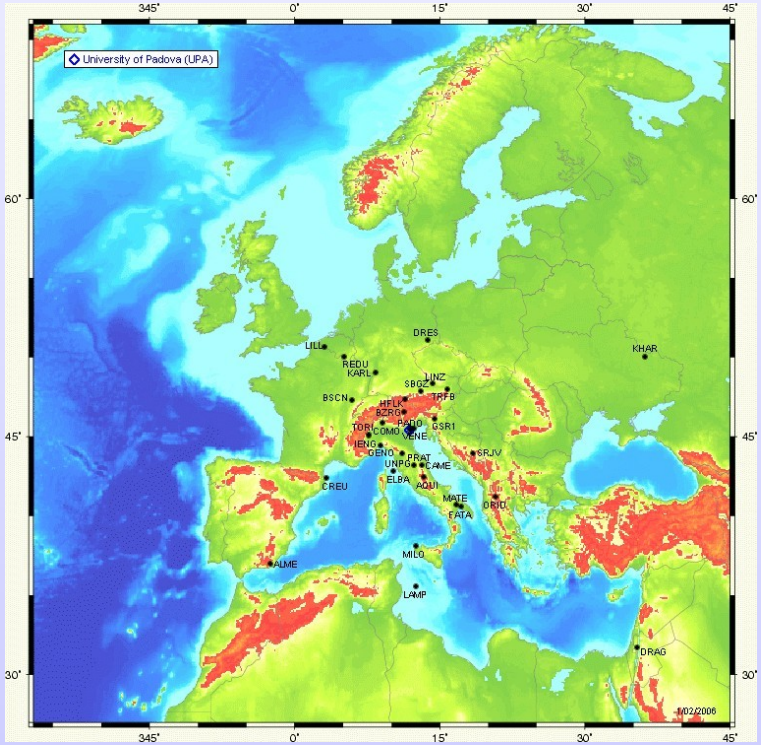
New stations

- When a new station is added to the UPA LAC subnetwork, its coordinates are computed using daily undifferenced data (PPP strategy), then they are put into EURF.CRD a-priori file.
- As soon as possible the PPP coordinates are substituted by the ones extracted from EUREF weekly SINEX.

Processed stations

ALME 13437M001	GENO 12712M002	ORID 15601M001
AQUI 12757M001	GSR1 14501M001	PADO 12750S001
BZRG 12751M001	HFLK 11006S003	PRAT 12760M001
CAME 12754M001	IENG 12724S001	REDU 13102M001
COMO 12761M001	KARL 14216M001	SBGZ 11031S001
CREU 13432M001	KHAR 12314M001	SRJV 11801S001
DRAG 20710S001	LAMP 12706M002	TORI 12724M002
DRES 14108M001	LINZ 11033S001	TRFB 11047M001
ELBA 12721M002	MATE 12734M008	UNPG 12752M001
FATA 12773M001	MILO 12758M001	VENE 12741M001

UPA lac subnetwork is made of 30 EUREF stations



Processing strategy

Software

- Data processing is done using Bernese 5 since GPS week 1324.
- Daily processing strategy is defined by RNX2SNX Process Control File.

Pre processing

- Stations showing large data gaps are eliminated.
- Receiver clocks are synchronized on sub-microsecond level using code-based zero-difference point positioning.
- Creation of single differences based on OBS-MAX strategy.
- Phase single-differences files are processed in order to detect and repair cycle slips.
- When a cycle slip cannot be fixed reliably, bad data points are removed or new ambiguities are set up.
- Unpaired observations and low elevation data are excluded.

Processing strategy

Basic observable, elevation cut-off, tropospheric and ionospheric corrections

- The basic observable is the GPS carrier phase (double differences, ionosphere free).
- The minimum elevation is 10 degree.
- Troposphere correction is computed by Sastaamoinen model (only for dry component, using dry-Niell mapping function). The wet component is estimated using wet-Niell mapping function.
- The final solution for each day of the week is obtained by GPSEST by constraining the ambiguities to the integer values obtained by the QIF method.

Weekly combination

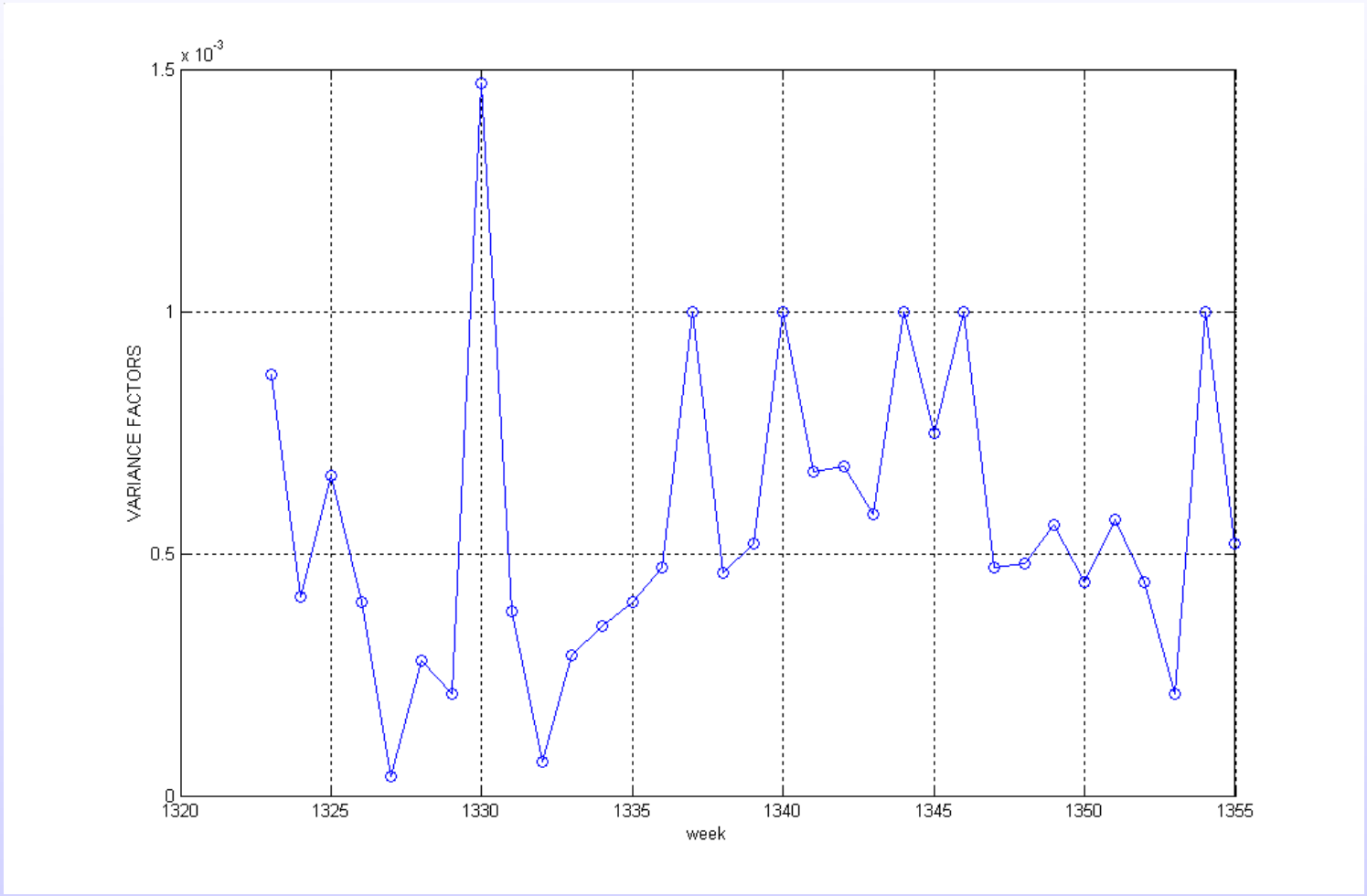
- Each daily solution provided by **RNX2SNX** (SINEX daily files) is stacked (by **ADDNEQ2** program) in order to estimate weekly coordinates and to generate weekly SINEX.
- Normal equations stacking is done using minimum constraints (only translation).

Tropospheric zenith delay

- Finally, the tropospheric zenith delay (TZD) is computed at hourly intervals fixing the stations coordinates to their weekly mean values, according to EUREF guidelines.

List of fiducial stations
MATE 12734M008
ALME 13437M001
DRES 14108M001
GENO 12712M002
KARL 14216M001
KHAR 12314M001
PADO 12750S001
TORI 12724M002

Validation of variance factor



Our validation factor seems to be sistematically less than the expected value.

Improving Bernese 5 (Windows version)

It would be useful to provide a Bernese uninstall script. Otherwhise a simple re-installation of the program will not reset certain environment variables and the MENU program will simply not be loaded by the Operating System.