# **TP01: CALCUL DU VTEC**

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# logiciel IMT: tec\_notigs.m

- · développé pour l'apprentissage et étapes automatisées (+1 lissage final par spline cubique)
- · Possibilité de traiter 1 an et plusieurs stations par 1 seul processus, mesures GPS, format rinex 2.x
- · Gestion des E/S par un fichier externe: tec\_notigs.txt

comment reference: I1 commentaire

ykro I2 marqueur GPS sur 4c

09 05 2024 I3 date (99 13 2024)

15 chemin utilitaires décompression

16 chemin biais satellites non compressé

17 chemin fichier almanach

18 chemin fichier GIM/codg non compressé

19 chemin archivage résultats 110 VTEC max pour le tracer

100

h:\tp01\decompression

h:\tp01\ ionex\p1p2\

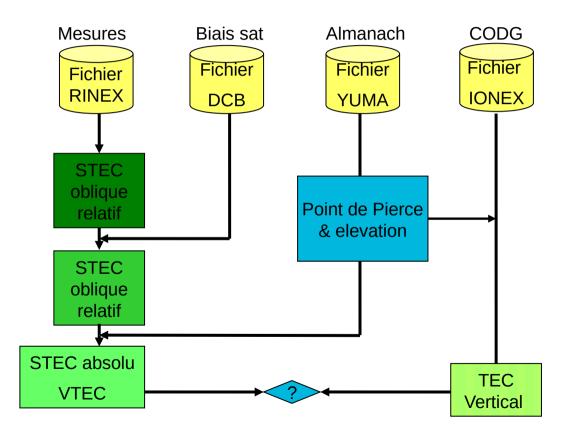
h:\tp01\ guard\yuma\

h:\tp01\ ionex\codq\2024\

h:\tp01\ vtec resu\2024\ykro\

# **CALCUL DU VTEC**

Le logiciel IMT Atlantique



Ligne 4 : Sites d'archivage des mesures RINEX

SOPAC: http://garner.ucsd.edu/pub/rinex/

CDDIS: https://cddis.nasa.gov/Data\_and\_Derived\_Products/GNSS/GNSS\_data\_and\_product\_archive.html

GAGE (ex. UNAVCO): https://www.unavco.org/data/gps-gnss/gps-gnss.html

IGN: <a href="mailto:ftp://igs.ign.fr/pub/igs/data/">ftp://igs.ign.fr/pub/igs/data/</a>

BKG: <a href="ftp://igs.bkg.bund.de">ftp://igs.bkg.bund.de</a>

Afrique du Sud: ftp.afrefdata.org



Le ftp 'anomyme' aux serveurs USA est définitivement arrêté.

ligne 7 : Almanach : fichiers journaliers
 https://celestrak.com/GPS/almanac/Yuma/
 Utiliser le fichier à t=319488s pour toute la semaine
 attention : renommer le fichier avec la bonne syntaxe (ex. yuma0265.txt)

# Cartes GIM journalieres et fichiers DCB (biais mensuel)

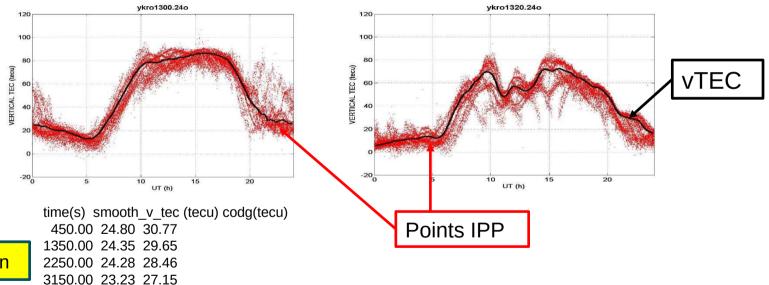
\* Web (infos): http://www.aiub.unibe.ch/research/code\_analysis\_center/global\_ionosphere\_maps\_produced\_by\_code/index\_eng.html téléchargements fichiers : http://ftp.aiub.unibe.ch/CODE/

- bigne 8: Valeurs du VTEC au format IONEX: extension inx (COD0OPSFIN\_20241300000\_01D\_01H\_GIM.INX)
- ligne 6: Biais satellites et stations (uniquement celles labélisées IGS): extension DCB (P1P22405\_ALL.DCB) Calendrier (date/DOY): <a href="https://www.ngs.noaa.gov/CORS/Gpscal.shtml">https://www.ngs.noaa.gov/CORS/Gpscal.shtml</a> (09/05/2024=130) ou <a href="https://webapp.csrs-scrs.nrcan-rncan.gc.ca/geod/tools-outils/calendr.php?locale=fr">https://webapp.csrs-scrs.nrcan-rncan.gc.ca/geod/tools-outils/calendr.php?locale=fr</a>

# Logiciel IMT : exemple de résultats

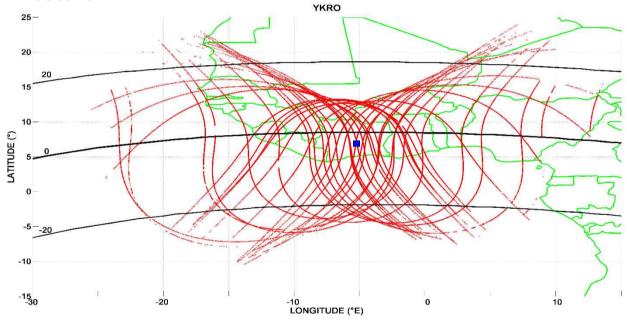
fichiers ykro1300.txt - codg\_ykro1300.jpg - vertical\_tec\_20240509.jpg

4050.00 23.65 25.67 4950.00 22.58 24.07 ....



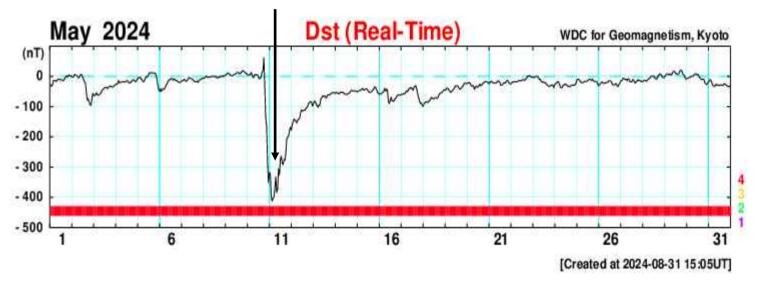
Tous les 15 mn

#### POINTS IPP 11/05/2024



**Indice magnétique D**<sub>st</sub> : Super orage le 11/05/2024

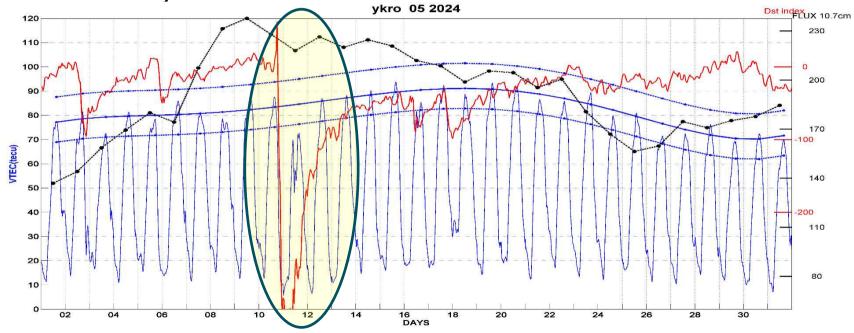
https://wdc.kugi.kyoto-u.ac.jp/dst\_realtime/202405/index.html



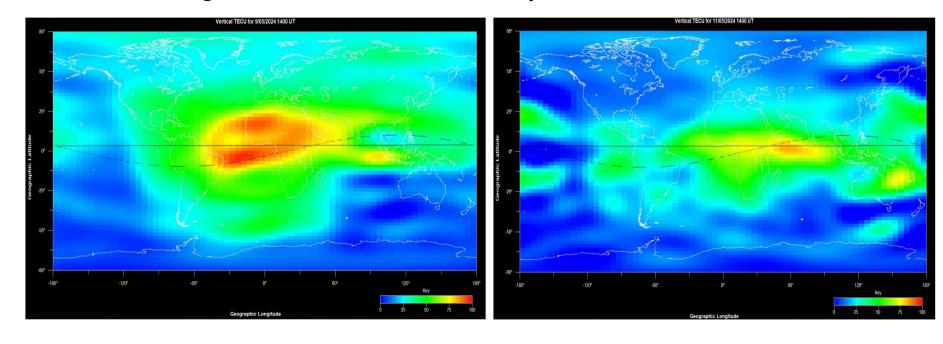
# **TP**: traitement 1 fichier journalier Ouest Afrique Valeur du VTEC à 46530s (12h2'30" TU), remplir les cases

dates stations	09/05/2024	10/05/2024	11/05/2024 132	12/05/2024
CPVG (Cap Vert)	X	X	X	Χ
YKRO (Cote d'Ivoire)	80,56	78,42	57,12	73,25
NKLG (Gabon)	88,31	88,41	<mark>65,08</mark>	92,62
MAS1 (Canaries)	66,74	66,02	22,73	46,81
ACRG (Ghana)	X	X	X	Χ
ASCG (I. Ascension))	Χ	X	X	Χ

YKRO: variation journalière mois de mai 2024



# Cartes GIM/codg 14TU les 09 et 11/05/2024 : phase <0 du vTEC



### **FORMAT RINEX**

Le nom des fichiers

Receiver INdependent Exchange Format (RINEX) V2.10 convention des noms - Exemple :

ykro3000.09d.gz

Hatanaka compressé

Logiciel existant

Observations

Année (2 derniers charactères)

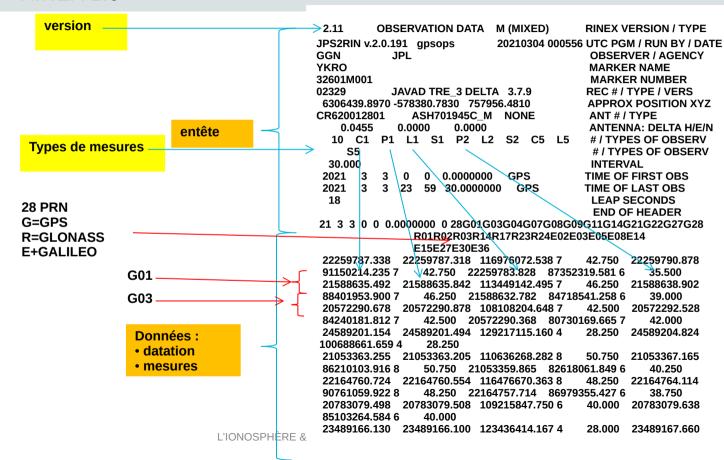
journée complète

quantième ou Day of the year (DOY)

Yamousoukro, Cote d'Ivoire (marqueur sur 4c)

#### **FORMAT RINEX**

#### RINEX 2.0



#### **FORMAT RINEX**

RINEX 3.0/4.0

#### RINEX 3.0 Le nom + compliqué ! ex: 3.0 COMPACT RINEX FORMAT CRINEX VERS / TYPE RNX2CRX ver.4.1.0 03-Jul-22 00:40 CRINEX PROG / DATE 3.04 OBSERVATION DATA M RINEX VERSION / TYPE NKLG00GAB R 20221830000 01D 30S MO.crx.gz sbf2rin-13.8.0 20220703 003412 UTC PGM / RUN BY / DATE NKLG MARKER NAME 32809M002 MARKER NUMBER Entête(1/2) GEODETIC MARKER TYPE REGINA CNES OBSERVER / AGENCY 3022492 SEPT POLARX5 5.4.0 REC # / TYPE / VERS 4811A48439 TRM59800.00 SCIS ANT # / TYPE 6287382.7332 1071574.1670 39133.0222 APPROX POSITION XYZ ANTENNA: DELTA H/E/N 3.0430 -0.0025 -0.0015 Les différents systèmes GNSS G 22 C1C L1C D1C S1C C1W S1W C2W L2W D2W S2W C2L L2L D2L SYS / # / OBS TYPES S2L C5Q L5Q D5Q S5Q C1L L1L D1L S1L SYS I # I OBS TYPES E 20 C1C L1C D1C S1C C6C L6C D6C S6C C5O L5O D5O S5O C7O SYS I # I OBS TYPES L70 D70 S70 C80 L80 D80 S80 SYS I # I OBS TYPES S 8 C1C L1C D1C S1C C5i L5i D5i S5i SYS I # I OBS TYPES R 16 C1C L1C D1C S1C C1P L1P D1P S1P C2P L2P D2P S2P C2C SYS / # / OBS TYPES L2C D2C S2C SYS / # / OBS TYPES C 24 C1P L1P D1P S1P C5P L5P D5P S5P C2I L2I D2I S2I C7I SYS / # / OBS TYPES L7I D7I S7I C6I L6I D6I S6I C7D L7D D7D S7D SYS / # / OBS TYPES I 4 C5A L5A D5A S5A SYS / # / OBS TYPES SEPTENTRIO RECEIVERS OUTPUT ALIGNED CARRIER PHASES. COMMENT NO FURTHER PHASE SHIFT APPLIED IN THE RINEX ENCODER. COMMENT G L1C SYS / PHASE SHIFT G L2W SYS / PHASE SHIFT G L2L 0.00000 SYS / PHASE SHIFT Les nombreux types de mesures G L5O 0.00000 SYS / PHASE SHIFT G L1L 0.00000 SYS / PHASE SHIFT E L1C 0.00000 SYS / PHASE SHIFT E L6C 0.00000 SYS / PHASE SHIFT E L5O 0.00000 SYS / PHASE SHIFT E L7Q 0.00000 SYS / PHASE SHIFT E L8O 0.00000 SYS / PHASE SHIFT S L1C SYS / PHASE SHIFT S L5I SYS / PHASE SHIFT R L1C SYS / PHASE SHIFT R L1P 0.00000 SYS / PHASE SHIFT R L2P 0.00000 SYS / PHASE SHIFT

3&23055611907 3&97555844806

#### **FORMAT RINEX**

RINEX 3.0/4.0

Entête (2/2) Le nombre de satellites suivis

Les mesures / ! Format différent /v2

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R L2C
                                                                         SYS / PHASE SHIFT
C L1P 0.00000
                                                                         SYS / PHASE SHIFT
C L5P 0.00000
                                                                         SYS / PHASE SHIFT
C L2I
                                                                          SYS / PHASE SHIFT
C L7I
                                                                          SYS / PHASE SHIFT
C I 6I
                                                                          SYS / PHASE SHIFT
C L7D
                                                                         SYS / PHASE SHIFT
I L5A
                                                                          SYS / PHASE SHIFT
                                                                          INTERVAL
                                                                         TIME OF FIRST OBS
          7 2 0 0 0.0000000 GPS
          7 2 23 59 30,0000000 GPS
                                                                         TIME OF LAST OBS
                                                                           # OF SATELLITES
C1C 0.000 C1P 0.000 C2C 0.000 C2P 0.000
                                                                          GLONASS COD/PHS/BIS
DBHZ
                                                                            SIGNAL STRENGTH UNIT
 22 R01 1 R02 -4 R03 5 R04 6 R05 1 R06 -4 R07 5 R08 6
                                                                          GLONASS SLOT / FRO #
   R09 -2 R10 -7 R11 0 R12 -1 R13 -2 R14 -7 R15 0 R17 4
                                                                          GLONASS SLOT / FRQ #
   R18 -3 R19 3 R20 2 R21 4 R23 3 R24 2
                                                                           GLONASS SLOT / FRO #
                                                                             END OF HEADER
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RINEX 3.0/4.0

### Translation de RINEX 3 en RINEX 2

Application gfzrnx

Site: https://gnss.gfz-potsdam.de/services/gfzrnx