UNIVERSIDADE ESTADUAL PAULISTA
"JÚLIO DE MESQUITA FILHO"

Assessment of global and regional ionospheric maps over Brazil using simulated kinematic precise point positioning.

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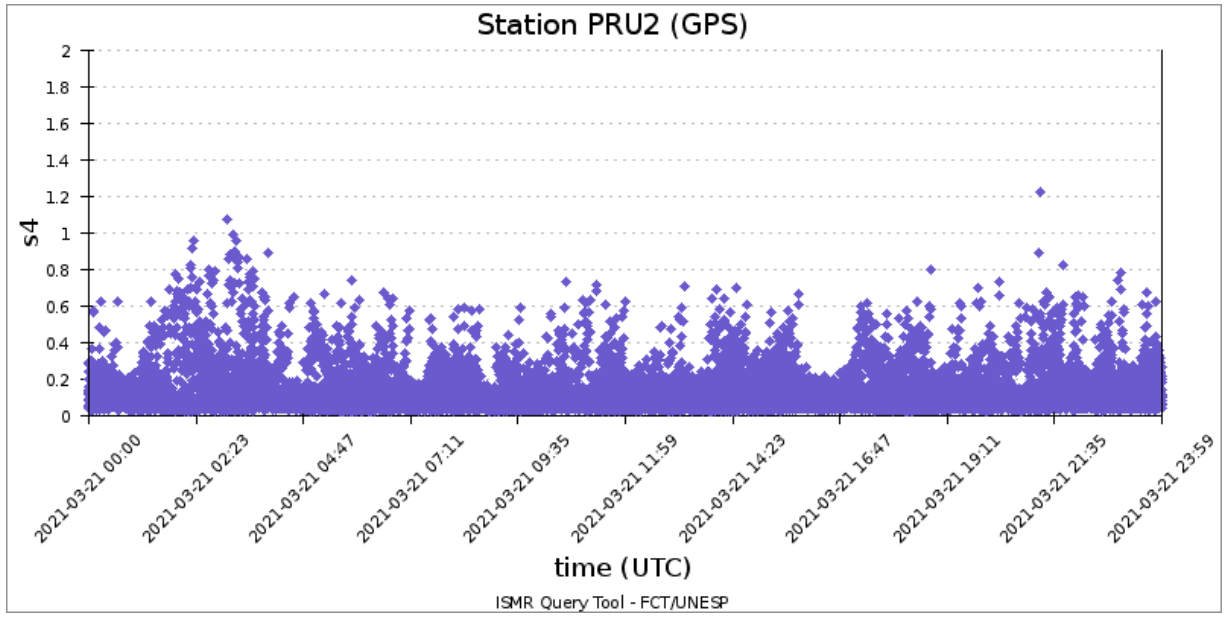
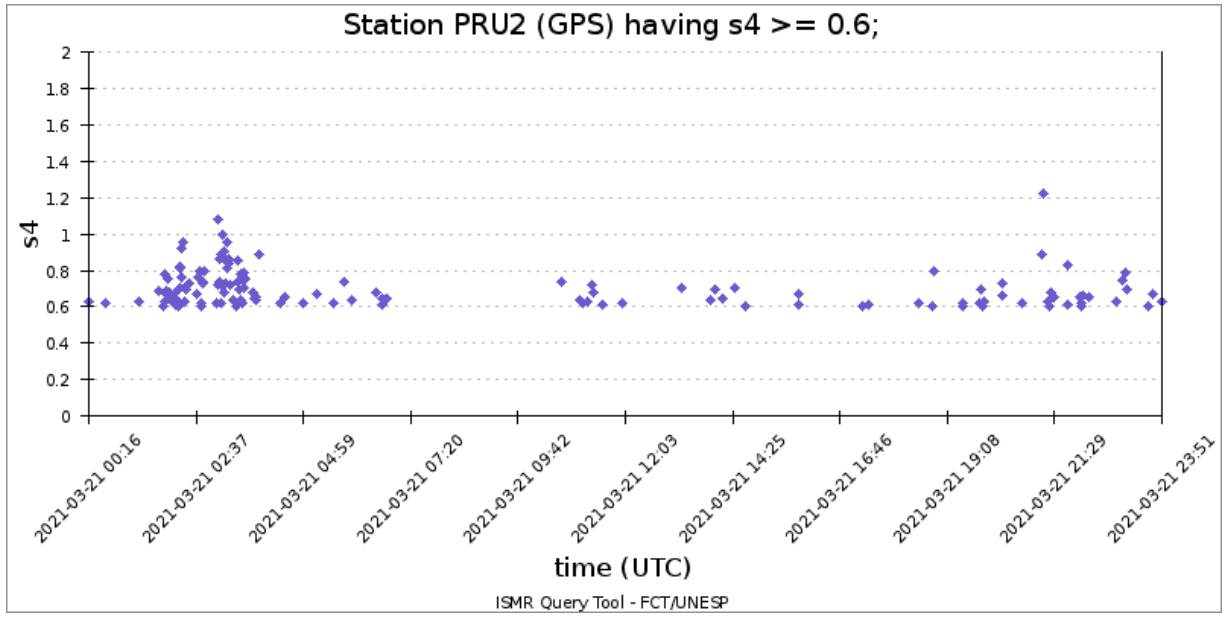
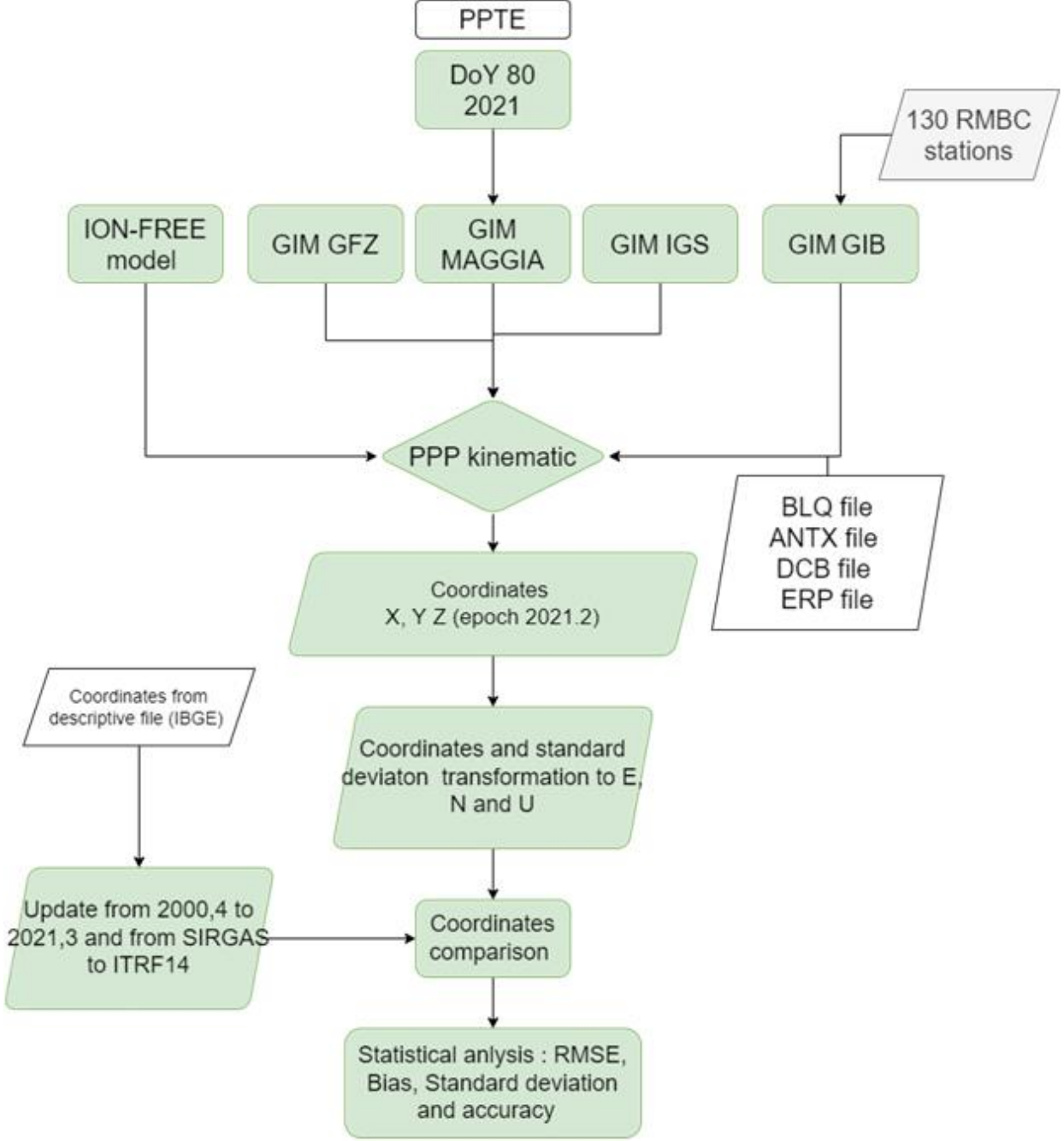
IONEX description

	CODE	GFZ	MAGGIA	GIB
Time interval (s)	3600	7200	900	300
Latitude step (°)	2.5	2.5	0.5	2
Longitude step (°)	5	5	0.5	2
Number of stations	255	247	218	130
Type	Global	Global	Regional	Regional
Type II	GPS	GNSS	GNSS	GPS

S4 index for the monitoring station PRU1 (a) Observation epochs with S4 index > 0.6







unesp

EGU General Assembly 2022

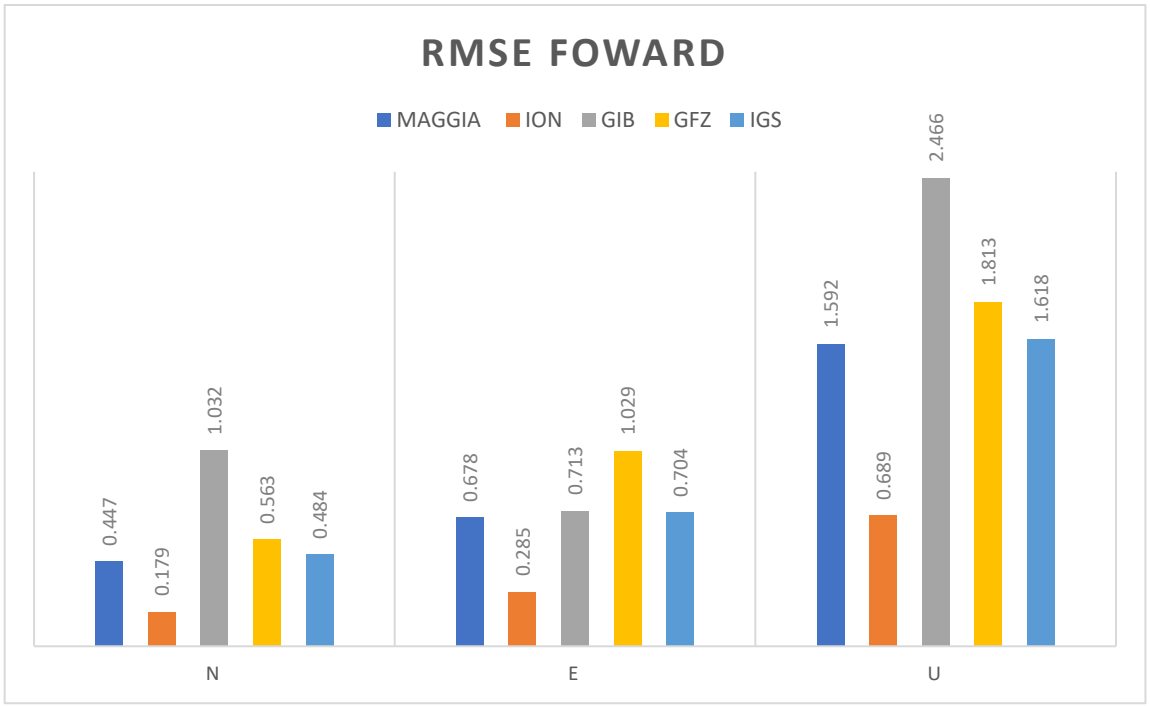
The station coordinates were updated in referencial and time. The starting reference was SIRGAS 2000 epoch 2000.4, the final reference was ITRF 2014 epoch 2021.3. The coordinates were also corrected for the velocities in the planimetric part using the VEMOS 2017 model. The final coordinates are presented on table 1, the applied velocities are

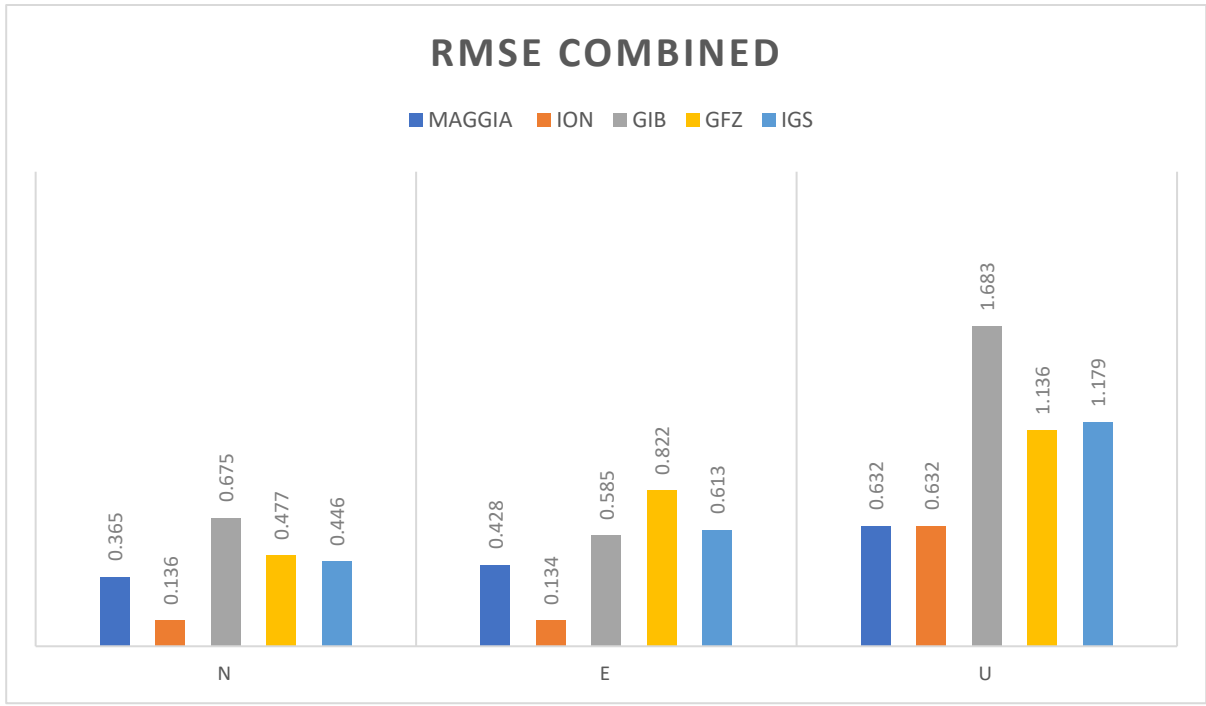
Coordinates used as reference for comparison

	E (m)	N (m)	H (m)
PPTE (SIRGAS 2000/2000.4)	7553844.609	457866.057	431.049
PPTE (ITRF14/2021.3)	7553844.869	457866.001	431.049

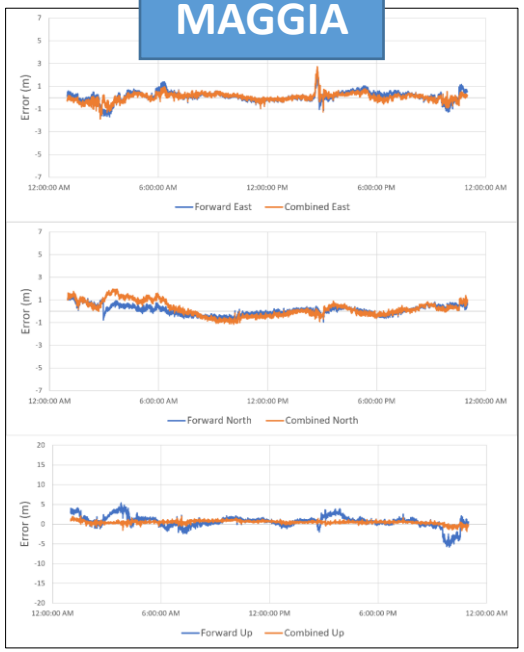
VEMOS 2017 velocity for the ENU components

	Ve (m)	Vn (m)	Vh (m)
Velocity	-0.0032	0.0122	-0.0005
Precision	0.0006	0.0005	0.0007

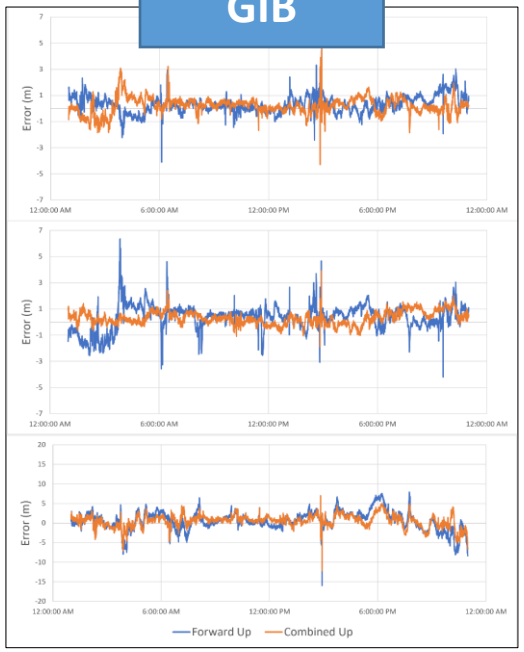

RMSE FOWARD
MAGGIA
ION
GIB
GFZ
IGS
0.447
0.179
1.032
0.563
0.484
0.678
0.285
0.713
1.029
0.704
1.592
0.689
2.466
1.813
1.618
N
E
U


RMSE COMBINED
MAGGIA
ION
GIB
GFZ
IGS
0.365
0.136
0.675
0.477
0.446
0.428
0.134
0.585
0.822
0.613
0.632
0.632
1.683
1.136
1.179
N
E
U

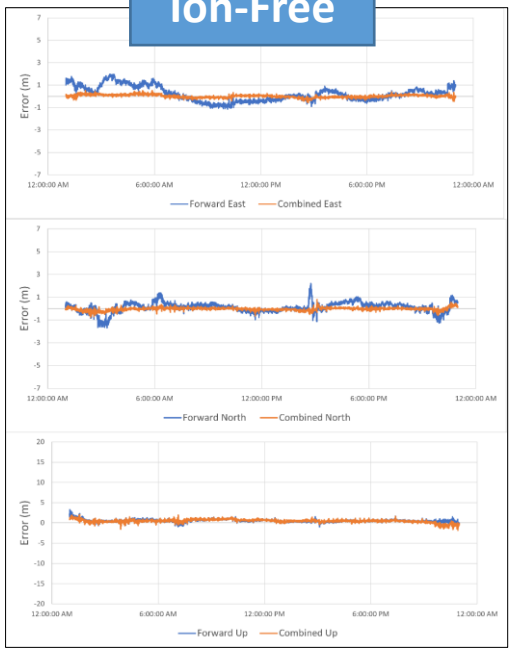
MAGGIA



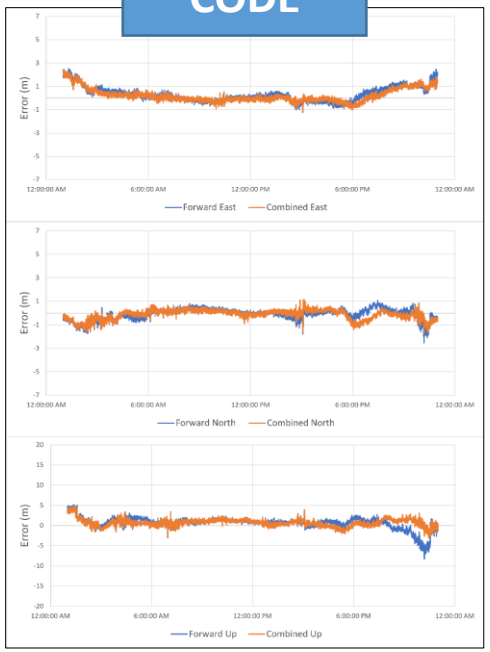
GIB



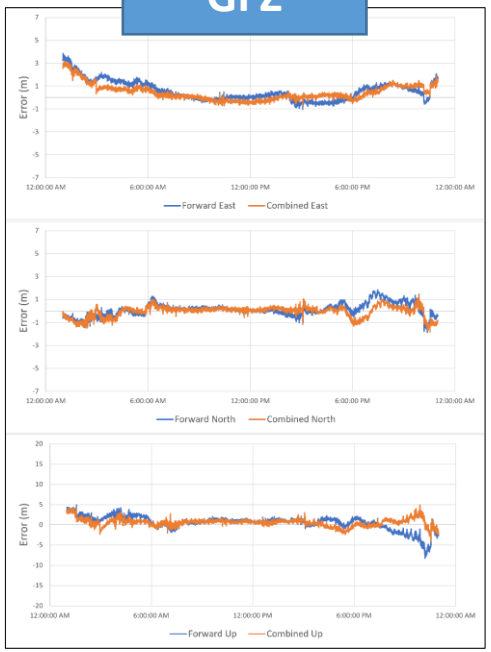
Ion-Free



CODE



GFZ



- A performance assessment of Global and Regional Ionospheric Maps in the single-frequency GNSS absolute positioning in Brazil during the DoY 80/2021 was carried out in this study;
- Using the combined solution, MAGGIA products can considerably increase the positioning accuracy when compared to the others Ionospheric Maps;
- CODE maps had the second-best result, showing that even without a large network for the analyzed location, its products are useful for modeling the first-order ionospheric effect;
- GFZ maps had a worse performance when compared to CODE maps and lastly, GIB, a Regional Ionospheric Map, had the worst result;