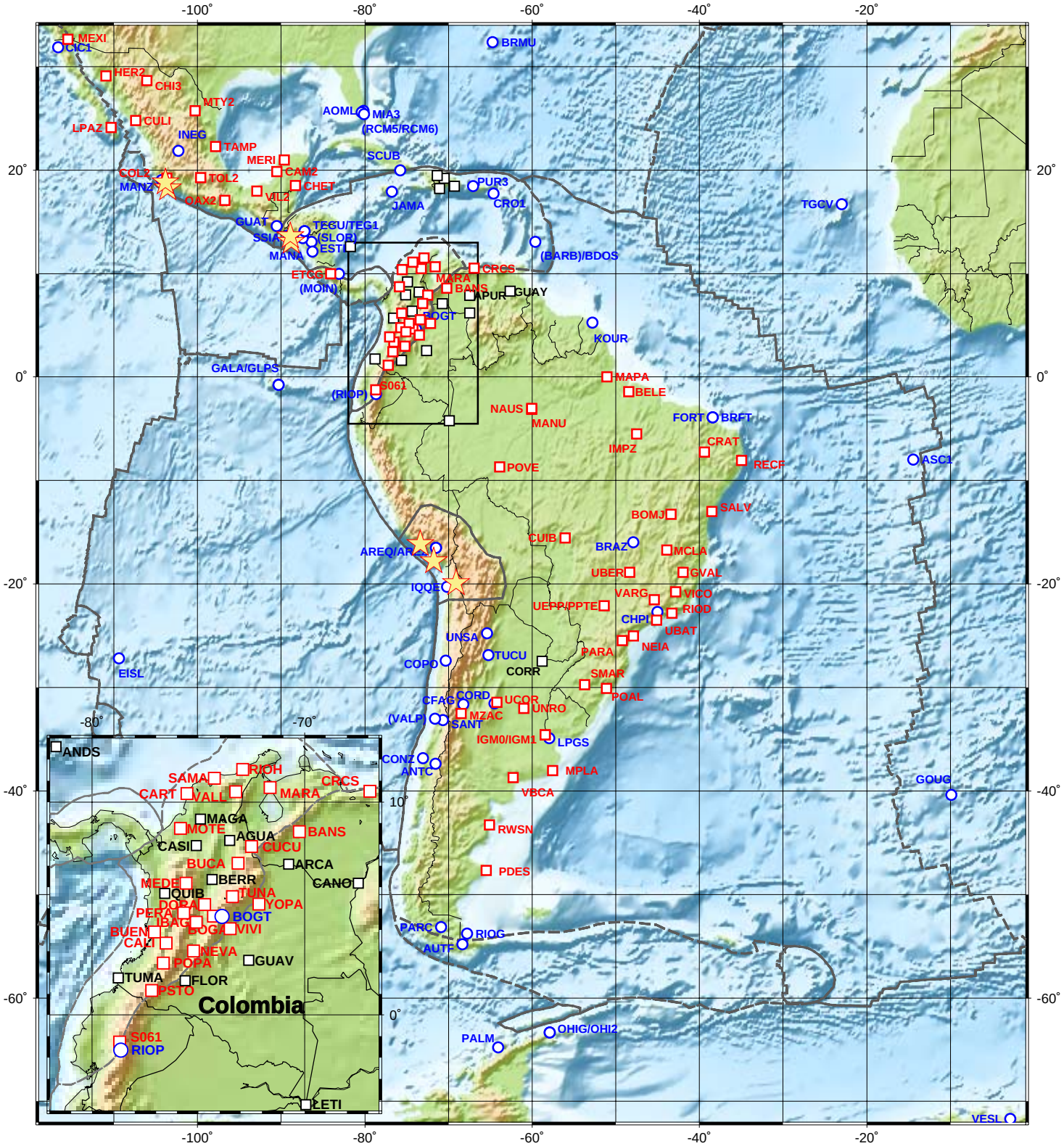
IGS RNAAC SIR Network



IGS global stations IGS regional stations

Prospective Stations Earthquakes with impact

(Stations with brackets: no observations since End of 2002)

IGS RNAAC SIR stations ordered by country

Country	Stations		Number	
	IGS Stations	Regional Stations	IGS	Reg.
Antarctica	OHIG/OHI2, PALM, VESL		3	
Argentina	AUTF, CFAG, CORD, LPGS, RIOG, TUCU, UNSA	IGM0/1, MPLA, MZAC, PDES, RWSN, UCOR, UNRO, VBCA	7	8
Barbados	BARB/BDOS		1	
Brazil	BRAZ, BRFT, CHPI, FORT	BELE, BOMJ, CRAT, CUIB, GVAL, IMPZ, MANU, MAPA, MCLA, NAUS, NEIA, PARA, POAL, POVE, RECF, RIOD, SALV, SMAR, UBAT, UBER, UEPP/PPTE, VARG, VICO	4	23
Cape Verde	TGCV		1	
Chile	ANTC, CONZ, COPO, COYQ, EISL, IQQE, PARC, SANT, VALP		9	
Colombia	BOGT	BOGA, BUCA, BUEN, CALI, CART, CUCU, DORA, IBAG, MEDE, MOTE, NEVA, PERA, POPA, PSTO, RIOH, SAMA, TUNA, VALL, VIVI, YOPA	1	20
Costa Rica	MOIN	ETCG	1	1
Cuba	SCUB		1	
Ecuador	GALA/GLPS, RIOP	S061	2	1
El Salvador	SSIA		1	
French Guyana	KOUR		1	
Guatemala	GUAT		1	
Honduras	SLOR, TEGU/TEG1		2	
Jamaica	JAMA		1	
Mexico	CIC1, INEG, MANZ	CAM2, CHET, CHI3, COL2, CULI, HER2, LPAZ, MERI, MEXI, MTY2, OAX2, TAMP, TOL2, VIL2	3	14
Nicaragua	ESTI, MANA		2	
Peru	AREQ/ARE2		1	
United Kingdom	ASC1, BRMU, GOUG		3	
USA	AOML, CRO1, MIA3, PUR3, RCM5/6		5	
Venezuela		BANS, CRCS, MARA		3
		Total Number of sites (8 are identical): 128	50	70

Station Network supporting IGS RNAAC SIR

Stat. / Country	ID	Domes No.
Antucu / CL	ANTC	41713S001
Key Biscayne / US	AOML	49914S001
Arequipa / PE *	AREQ	42202M005
Arequipa 2 / PE *	ARE2	42202M005
Ascension / UK	ASC1	30602M001
Ushuaia / AR	AUTF	41515S001
Barinas / VE	BANS	42403M001
Barbados / BB *	BARB	43401S001
Barbados / BB *	BDOS	43401S001
Belem / BR	BELE	41622M001
Bogota / CO	BOGA	41901M002
Bogota (IGS) / CO	BOGT	41901M001
Bom Jesus da Lapa / BR	BOMJ	41612M001
Brasilia / BR	BRAZ	41606M001
Eusebio / BR	BRFT	41602M002
Bermuda / UK	BRMU	42501S004
Bucaramanga / CO	BUCA	41911S001
Buenaventura / CO	BUEN	41912S001
Cali / CO	CALI	41903S001
Campeche / MX	CAM2	40514M001
Cartagena / CO	CART	41902M001
Caucete / AR	CFAG	41517S001
Chetumal / MX	CHET	40526M001
Chihuahua / MX	CHIH	40525M001
Cachoeira / BR	CHPI	41609M003
Ensenada / MX	CIC1	40508M002
Colima / MX	COL2	40524M001
Concepcion / CL	CONZ	41719M002
Copiapo / CL	COPO	41714S001
Cordoba / AR	CORD	41511M001
Coyhaique / CL	COYQ	41715S001
Crato / BR	CRAT	41619M001
Caracas / VE	CRCS	42401M001
Saint Croix / US	CRO1	43201M001
Cucuta / CO	CUCU	41904S001
Cuiaba / BR	CUIB	41603M001
Culiacan / MX	CULI	40523M001
La Dorada / CO	DORA	41915S001
Easter Island / CL	EISL	41703M003
Esteli / NI	ESTI	41202S001
Heredia / CR	ETCG	40602M001
Fortaleza / BR	FORT	41602M001
Galapagos / EC *	GALA	42005M001
Galapagos / EC *	GLPS	42005M002
Gough / UK	GOUG	30608M001
Guatemala / GT	GUAT	40901S001
Gov. Valadares / BR	GVAL	41623M001
Hermosillo / MX	HER2	40522M001
Ibague / CO	IBAG	41918S001
Buenos Aires / AR *	IGM0	41505M002
Buenos Aires / AR *	IGM1	00000M001
Imperatriz / BR	IMPZ	41615M001
Aguascalientes / MX	INEG	40507M001
Iquique / CL	IQQE	41708S002
Kingston / JM	JAMA	42601S001
Kourou / FR	KOUR	97301M210
La Paz / MX	LPAZ	40521M001
La Plata / AR	LPGS	41510M001
Managua / NI	MANA	41201S001
Manaus / BR	MANU	41614M001
Manzanillo / MX	MANZ	40513S001
Macapa / BR	MAPA	41629M001
Maracaibo / VE	MARA	42402M001
Montes Claros / BR	MCLA	41624M001
Medellin / CO	MEDE	41921S001
Merida / MX	MERI	40520M001
Mexicali / MX	MEXI	40519M001
Miami 3 / US	MIA3	00000S001
Limon / CR	MOIN	40601M001
Monteria / CO	MOTE	41922S001
Mar del Plata / AR	MPLA	41521M001
Monterrey / MX	MTY2	40518M001
Mendoza / AR	MZAC	41503M001
Manaus / BR	NAUS	41614M002
Cananeia / BR	NEIA	41620M002
Neiva / CO	NEVA	41923S001
Oaxaca / MX	OAX2	40517M001
O'Higgins / AN *	OHIG	66008M001
O'Higgins / AN *	OHI2	66008M005
Palmer / AN	PALM	66005M002
Curitiba / BR	PARA	41610M001
Punta Arenas / CL	PARC	41716S001
Puerto Deseado / AR	PDES	41524M001
Pereira / CO	PERA	41905S001
Porto Alegre / BR	POAL	41616M001
Popayan / CO	POPA	41924S001
Porto Velho / BR	POVE	41628M001
Pres.Prudente / BR *	PPTE	41611M002
Pasto / CO	PSTO	41925S001
Puerto Rico 3 / US	PUR3	82001S003
Richmond 5 / US *	RCM5	40499S018
Richmond 6 / US *	RCM6	40499S020
Recife / BR	RECF	41617M001
Rio de Janeiro / BR	RIOD	41608M001
Rio Grande / AR	RIOG	41507M004
Riohacha / CO	RIOH	41927S001
Riobamba / EC	RIOP	42006M001
Rawson / AR	RWSN	41513M001
Quito / EC	S061	42003S003
Salvador / BR	SALV	41618M001
Santa Maria / CO	SAMA	41928S001
Santiago/Chile / CL	SANT	41705M003
Santiago/Cuba / CU	SCUB	40701M001
San Lorenzo / HN	SLOR	41102S001
Santa Maria / BR	SMAR	41621M001
San Salvador / SV	SSIA	41401S001
Tampico / MX	TAMP	40516M001
Tegucigalpa / HN *	TEGU	41101S001
Tegucigalpa 1 / HN *	TEG1	41101S001
Palmeira / CV	TGCV	39601S001
Toluca / MX	TOL2	40515M001
Tucuman / AR	TUCU	41520S001
Tunja / CO	TUNA	41903S001
Ubatuba / BR	UBAT	41627M001
Uberlandia / BR	UBER	41625M001
Univ. Cordoba / AR	UCOR	00000M001
Pres. Prudente / BR *	UEPP	41611M001
Rosario / AR	UNRO	41525M001
Salta / AR	UNSA	41514M001
Valledupar / CO	VALL	41906S001
Valparaiso / CL	VALP	41712S001
Varginha / BR	VARG	41626M001
Bahia Blanca / AR	VBCA	41512M001
Sanae/Veslesk. / AN	VESL	66009M001
Vicosa / BR	VICO	41613M001
Villahermosa / MX	VIL2	40527M001
Villavicencio / CO	VIVI	41931S001
Yopal / CO	YOPA	41932S001

Total: 128 stations, 50 IGS, 70 regional
(8 stations are identical *)

Known Prospective Stations:

Argentina		
Corrientes / AR	CORR	00000M001
Colombia		
Aguachica / CO	AGUA	41907S001
San Andres / CO	ANDS	41908S001
Arauca / CO	ARCA	41909S001
Puerto Berrio / CO	BERR	41910S001
Puerto Carreno / CO	CANO	41913S001
Caucasia / CO	CASI	41914S001
Florencia / CO	FLOR	41916S001
San Jose Guaviare / CO	GUAV	41917S001
Leticia / CO	LETI	41919S001
Magangue / CO	MAGA	41920S001
Quibdo / CO	QUIB	41926S001
Tumaco / CO	TUMA	41929S001
Dominicanian Republic		
? BARA, LVEG, SPED, SROD		00000S001
Venezuela		
Apure / VE	????	?????M001
Guayana / VE	????	?????M001

Data flow and processing schedule at IGS RNAAC SIR

GPS week	Process
GPS week i	Observation data (stations)
GPS week i+1	RINEX files from stations to Global Data Centres
GPS week i+2	retrieving of final orbits and RINEX files by RNAAC SIR (DGFI)
GPS week i+3	Global solutions (G-SINEX) to Global Data Centres
GPS week i+4	RNAAC SIR regional solution (R-SINEX) to Global Data Centres
GPS week i+5	Combined polyhedron solution (P-SINEX) by MIT and NCL
GPS week i+6	Polyhedron solution to Global Data Centres, analysis and comparison of RNAAC SIR R-SINEX with P-SINEX by RNAAC SIR

PROCESSING STRATEGY BPE 4.2 / 5.0

Analysis approach (daily solutions)

	BPE Version 4.2	BPE Version 5.0
Start of processing	GPS week 0860	GPS week 1301
Elevation cutoff	10°	5°
Sampling rate	30 sec.	
Orbits/EOP	IGS final orbits referred to ITRF2000/IGb00	
Troposphere	Zenith delay estimated each 2 hours, a priori sigmas applied with respect to prediction model: - first parameter +/- 5m absolute, following parameters +/- 10cm rel.	
Ambiguities	partly resolved, remaining estimated as real values, no constraints	
Ocean loading	implemented since GPS week 1156	
Mapping function	Saastamoinen	Niell

PROCESSING STRATEGY BPE 4.2 / 5.0

Analysis approach (fixed weekly solutions)

BPE Version 4.2

The coordinates and velocities are "constrained" due to the fiducial point concept to IGb00 values of ASC1, CRO1, EISL, FORT, KOUR, LPGS, OHIG/OHI2, RIOG and SANT

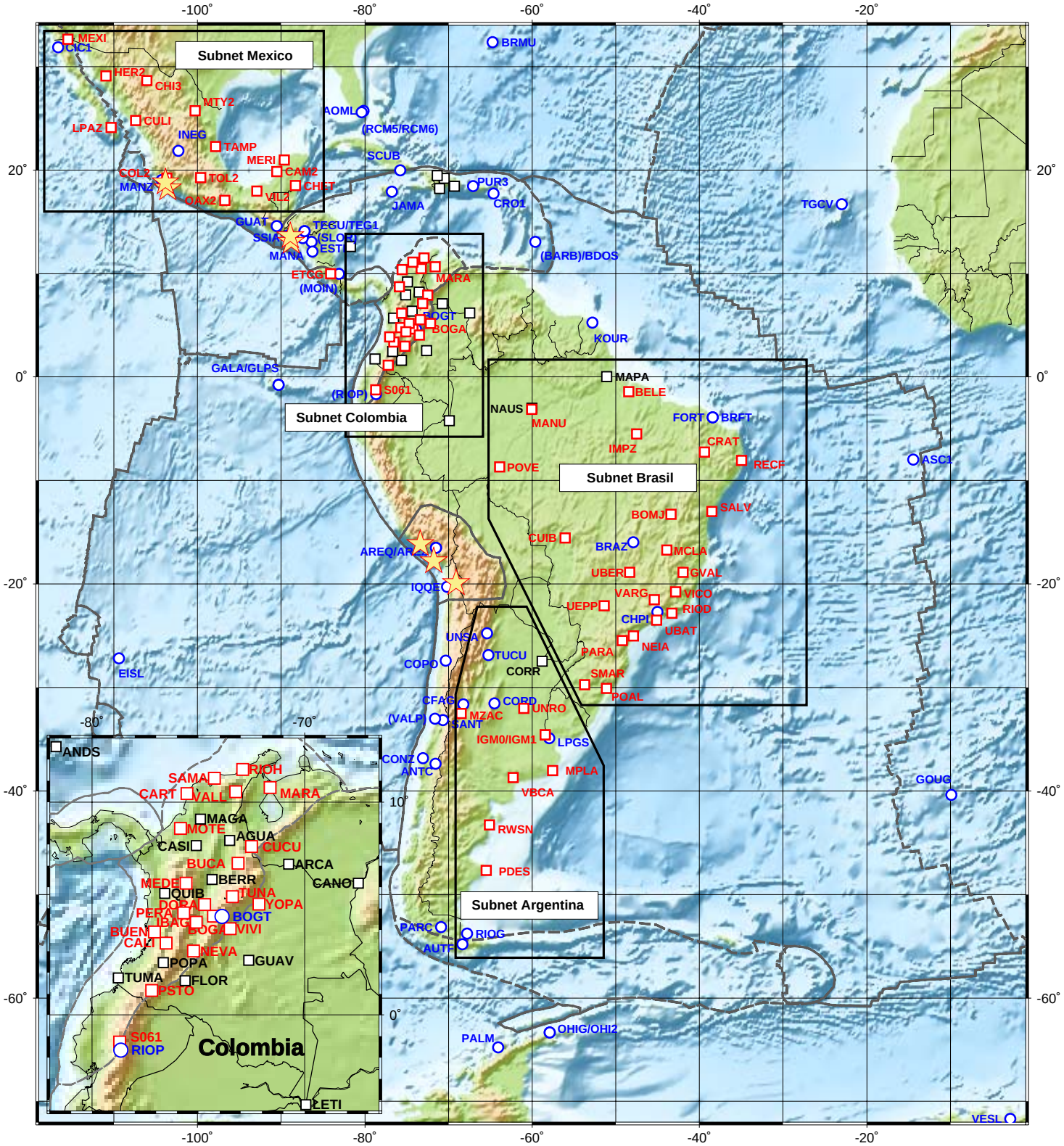
Therefore the time series generated by BPE version 4.2 show nearly straight lines for the fiducial points

BPE Version 5.0

The coordinates and velocities are "constrained" by minimizing the no net rotation and the no net translation condition of the same fiducial points.

Therefore the fiducial points are allowed to vary considerably.

IGS RNAAC SIR Sub-Networks (Proposal)

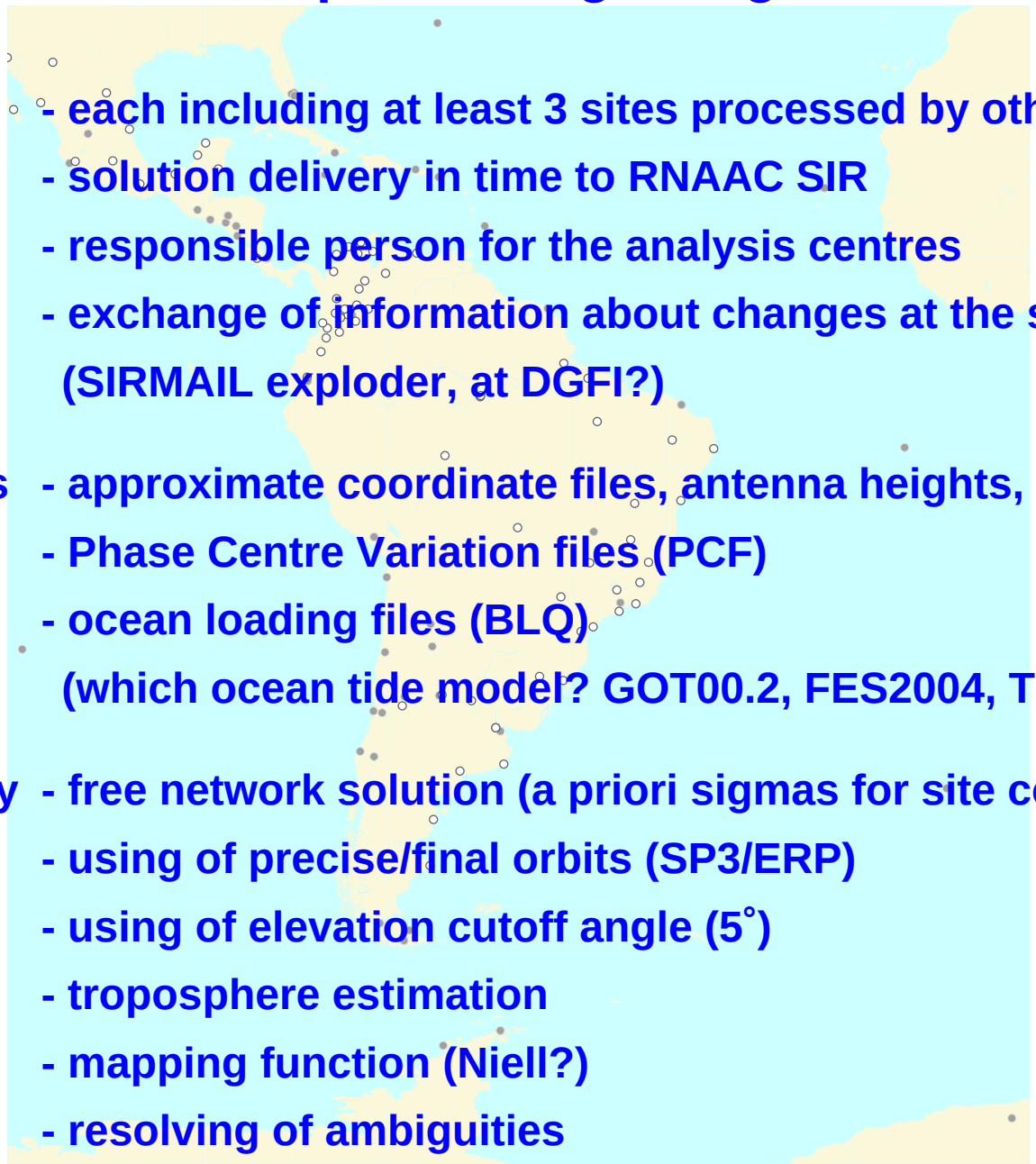


IGS global stations IGS regional stations

Prospective Stations Earthquakes with impact

(Stations with brackets: no observations since End of 2002)

Remarks on distributed processing at regional analysis centres



Sub-networks

- each including at least 3 sites processed by other analysis centres
- solution delivery in time to RNAAC SIR
- responsible person for the analysis centres
- exchange of information about changes at the stations, etc.
  (SIRMAIL exploder, at DGFI?)

Common input files

- approximate coordinate files, antenna heights, station names, ...
- Phase Centre Variation files (PCF)
- ocean loading files (BLQ)
  (which ocean tide model? GOT00.2, FES2004, TPXO.7.0, ... ?)

Processing strategy

- free network solution (a priori sigmas for site coordinates, 1m)
- using of precise/final orbits (SP3/ERP)
- using of elevation cutoff angle (5°)
- troposphere estimation
- mapping function (Niell?)
- resolving of ambiguities

Comparison of RNAAC SIR and FCAGLP daily coordinate solutions

GPS week 1372 (days 113 to 119, 2006), best day 113

	Residuals after Helmert transformation			Absolute comparison (differences)		
STATION	NORTH [mm]	EAST [mm]	UP [mm]	NORTH [mm]	EAST [mm]	UP [mm]
CONZ	-1.9	3.9	5.3	-132.6	71.2	228.4
CORD	0.5	0.4	3.9	-154.6	43.6	232.8
LPGS	-0.2	-0.2	-0.4	-135.2	22.2	246.0
OHI2	3.1	-0.1	-1.3	38.2	23.4	286.6
RIOG	1.1	-1.2	3.3	-27.8	53.0	279.4
UNSA	1.6	0.8	-7.4	-184.8	47.6	186.2
VBCA	-1.0	1.0	-0.1	-115.8	36.8	252.6
PALM	-0.7	1.0	1.0	40.8	45.4	286.6
RWSN	1.1	0.3	-12.2	-89.2	44.8	248.8
IGM1	-0.2	-1.0	-8.9	-136.0	23.8	236.0
UNRO	2.6	-0.6	13.5	-145.4	29.8	251.6
PDES	-6.9	-3.2	4.3	-70.6	44.2	274.2
MZAC	0.7	-1.2	9.5	-149.6	55.6	237.2
RMS	2.5	1.7	7.3			
	RMS of transformation: 4.8 mm			RMS of unit weight for coordinate comparison: 0.1152		

Comparison of RNAAC SIR and FCAGLP daily coordinate solutions

GPS week 1372 (days 113 to 119, 2006), worst day 118

	Residuals after Helmert transformation			Absolute comparison (differences)		
STATION	NORTH [mm]	EAST [mm]	UP [mm]	NORTH [mm]	EAST [mm]	UP [mm]
CONZ	-0.7	3.1	-5.1	-23.4	77.0	352.2
CORD	2.4	-0.9	6.8	-58.2	18.4	370.8
LPGS						
OHI2	1.9	4.1	-14.1	192.8	-3.8	310.8
RIOG	0.6	-11.5	7.7	120.2	37.6	355.6
UNSA	-2.3	4.0	-18.3	-111.2	27.2	334.8
VBCA	-3.6	1.4	-3.7	-3.6	9.4	364.2
PALM	-0.6	6.0	5.7	205.8	36.8	323.4
RWSN	2.0	-3.4	-0.4	37.8	24.0	364.2
IGM1	-3.0	-1.3	-2.4	-35.8	-19.0	365.4
UNRO	-0.1	-1.0	10.5	-48.4	-6.2	377.2
PDES						
MZAC	3.4	-0.6	13.3	-49.6	48.0	374.4
RMS	2.3	4.8	10.0			
	RMS of transformation: 7.0 mm			RMS of unit weight for coordinate comparison: 0.1514		

Comparison of RNAAC SIR and FCAGLP weekly coordinate solutions

GPS week 1372 (days 113 to 119, 2006)

STATION	Residuals after Helmert transformation free network adjustment			Residuals after Helmert transformation "fixed" network adjustment		
	NORTH [mm]	EAST [mm]	UP [mm]	NORTH [mm]	EAST [mm]	UP [mm]
CONZ	-2.6	3.7	-9.8	-4.2	3.8	-1.4
CORD	1.7	-0.6	5.6	1.4	-1.3	1.3
LPGS	0.3	-0.5	-2.2	5.0	3.8	30.0
OHI2	1.2	0.4	-4.3	4.3	-2.7	-14.1
RIOG	0.9	-2.8	12.0	1.3	-1.7	9.3
UNSA	0.4	-0.8	-9.1	-0.4	-4.5	-15.2
VBCA	-1.0	-0.3	3.9	-1.0	1.2	0.2
PALM	1.6	1.5	-5.8	0.0	-1.5	0.2
RWSN	1.4	1.3	-6.4	0.9	3.2	-5.5
IGM1	0.3	-1.4	-6.3	0.9	-0.9	-17.3
UNRO	0.9	-1.2	7.7	1.3	-1.2	-0.4
PDES	-7.3	-3.7	7.5	-8.0	-1.8	10.2
MZAC	1.4	-0.1	7.2	0.5	-0.5	8.0
SANT	0.6	4.4	0.1	-2.0	4.3	-5.4
RMS	2.4	2.2	7.2	3.3	2.8	12.2
	RMS of transformation: 4.8 mm			RMS of transformation: 7.9 mm		

Comparison of RNAAC SIR and IGAC daily coordinate solutions

GPS week 1369 (days 092 t0 098, 2006), day 095

STATION	Residuals after Helmert transformation			STATION	Residuals after Helmert transformation		
	North [mm]	East [mm]	Up [mm]		North [mm]	East [mm]	Up [mm]
BOGT	0.9	0.8	1.9	CALI	-0.4	0.8	-11.6
BRAZ	1.9	2.6	1.4	CUCU	-1.3	1.8	-18.5
BRFT	6.7	6.5	4.6	PERA	0.1	-1.5	-1.1
CHPI	-1.1	4.5	3.3	VALL	-3.0	0.7	-8.6
CRO1	-0.3	0.4	-0.6	ETCG	1.5	-3.8	16.0
GLPS	5.3	2.9	-12.0	BUCA	-4.2	-2.7	8.4
GUAT	10.9	4.1	14.1	VIVI	-6.1	-2.2	5.7
KOUR				MEDE	-5.2	-4.0	12.3
MANA	8.0	4.7	7.5	PSTO	-5.2	-1.8	10.6
SCUB				BUEN	1.3	-1.5	-8.7
UNSA	-5.8	-1.5	6.1	TUNA	1.5	-0.6	3.6
BOMJ	0.1	0.4	2.7	RIOH	-1.7	-0.1	-16.9
CUIB	-0.7	-3.1	-2.1	NEVA	-4.7	-2.3	1.1
IMPZ				DORA	0.4	-0.2	-10.3
MARA	0.1	2.0	-3.3	IBAG	1.1	-0.1	-3.5
SALV	5.8	-6.5	-3.9	MOTE	-6.2	-1.1	-2.5
BOGA	0.4	0.7	4.4				
				RMS	4.2	2.9	8.7
					RMS of transformation: 6.0 mm		

Comparison of RNAAC SIR and IGAC weekly coordinate solutions

GPS week 1369 (days 092 t0 098, 2006)

STATION	Residuals after Helmert transformation			STATION	Residuals after Helmert transformation		
	North [mm]	East [mm]	Up [mm]		North [mm]	East [mm]	Up [mm]
BOGT	0.4	-0.7	6.4	CALI	0.1	0.6	-7.9
BRAZ	4.0	2.4	-4.8	CUCU	-0.9	1.0	-15.6
BRFT	7.0	3.6	0.3	PERA	0.9	-1.3	1.9
CHPI	0.8	3.1	0.0	VALL	-1.8	1.2	-14.3
CRO1	-1.0	4.2	4.3	ETCG	-0.9	-2.1	9.3
GLPS	5.8	6.4	-12.3	BUCA	-4.5	-4.1	10.9
GUAT	8.0	5.0	6.6	VIVI	-5.8	-3.0	7.1
KOUR				MEDE	-4.9	-4.6	13.2
MANA	5.9	5.8	1.6	PSTO	-4.2	-5.0	11.8
SCUB	-1.8	0.4	-14.1	BUEN	1.9	-0.2	-5.4
UNSA	1.2	2.2	1.6	TUNA	1.4	-1.4	4.6
BOMJ	0.1	0.5	-2.9	RIOH	-0.7	-0.2	-10.5
CUIB	2.1	-1.0	-9.9	NEVA	-4.2	-3.0	9.2
IMPZ	-5.7	-4.2	8.1	DORA	0.5	-0.4	-8.9
MARA	1.1	-1.2	-4.6	IBAG	1.5	-1.3	-0.9
SALV	-2.5	1.3	3.5	MOTE	-4.0	-3.7	8.7
BOGA	0.2	-0.1	11.4				
				RMS	3.5	3.0	8.6
					RMS of transformation: 5.8 mm		

Available data/information at DGFI ftp server

Directory	Data/Information	Remarks
pub/gps/SIR	SIR08607.SNX.Z, SIR08607.SUM.Z to SIR13807.SNX.Z, SIR13807.SUM.Z, etc.	free network adjustments for IGS (SINEX and summary files)
pub/gps/DGF	DGF04P01.SNX, DGF06P01.SNX, DGF06P01.CRD, DGF06P01.VEL, timeseries_060720.pdf, DGF_Report76.pdf	yearly position/velocity solutions coordinate/velocity files timeseries of all stations
pub/gps/DGF/2005 pub/gps/DGF/2006	dgf1304sir.crd to dgf1355sir.crd dgf1356sir.crd to dgf1380sir.crd, etc.	coordinate solutions 2005/2006 (processed with BPE 5.0)
pub/gps/DGF/1998 to pub/gps/DGF/2004	dgf0938sir.crd to dgf0990sir.crd dgf1356sir.crd to dgf1380sir	coordinate solutions 1998 to 2004 (processed with BPE 4.2)
In Preparation/Future: pub/gps/DGF	PCV file, ITRFMMYY.CRD, ITRFCODE.BLQ, etc., LOG and DIF files, sensitive maps, etc.	common files for Sub-Centres LOG/DIF files, clickable maps, etc.
pub/gps/DGF/SIRMAIL	SIRMAIL Exploder	mail exploder for SIRGAS