Velocity analysis of colocated sites based on a preliminary DORIS combination

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Overview

- Method :
  - Which inputs ?
  - Velocity determination
  - Colocated sites determination
- Results :
  - per station results
  - statistics over the whole network
- Future analysis

Method

- Combination :
  - Combination of the time series of 4 ACs : LCA, IGN, GOP & INA
  - Data span : 2.5 years (2005.0 to 2007.5 → 134 weeks)
  - → input of the analysis = STCD files : time series of weekly velocities and associated stdev.
- Velocities determination :
  - No analysis if # of weeks for a given station in the combination is < 30 ➔ 48 stations remain
  - Determination of the velocities : linear regression on the velocity series with stdev. as apriori variance
- Colocations :
  - Colocation = GPS and/or SLR and/or VLBI station(s) closer than 50 km from a DORIS site
  - NB. Velocities of « older » but stable sites are taken into account for the comparison

Results (1/5) – Table of velocities

Combined velocities

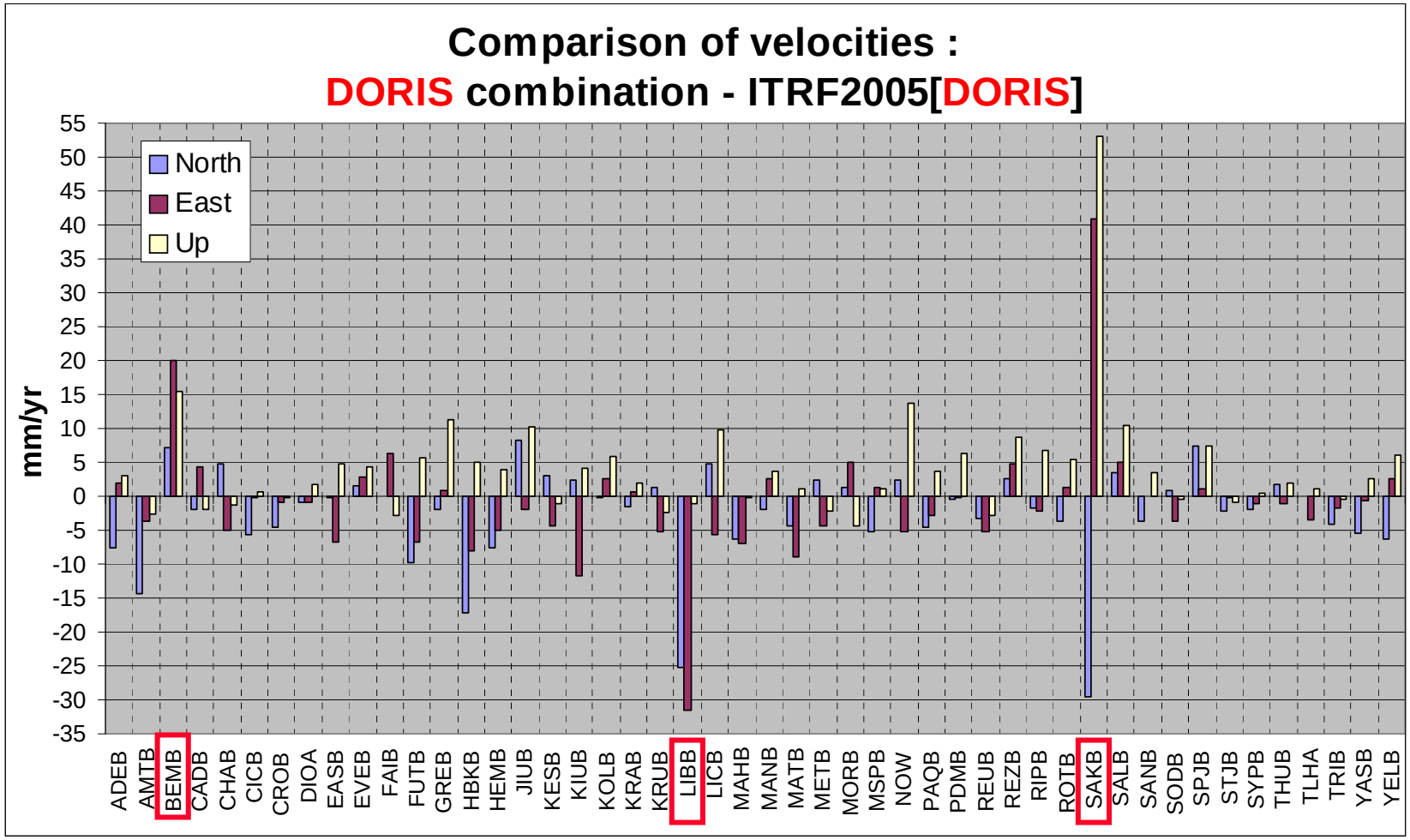
ITRF 2005 velocities

all velocities given in mm/yr

		WEEKLY DORIS COMBINATION			I T R F 2 0 0 5			
					DORIS	GPS	SLR	VLBI
	#sol	V	sigV		V	V	V	V
N		-18.4	1.3		-10.7	.....	.....	.....
ADEB E	128	12.7	2.1		10.7	.....	.....	.....
U		3.7	1.8		0.6	.....	.....	.....
		.....	.....		.....	.....	.....	.....
N		11.4	1.5		13.3	12.0	.....	.....
CADB E	119	1.3	3.6		-3.0	-3.2	.....	.....
U		0.8	2.5		2.8	3.4	.....	.....
		.....	.....		.....	.....	.....	.....
N		14.7	1.5		14.8	15.8	.....	16.0
TLHA E	125	15.4	2.5		18.7	19.3	.....	19.2
U		1.5	1.6		0.4	0.4	.....	0.4
		.....	.....		.....	.....	.....	.....
N		-17.3	1.3		-11.1	-11.0	.....	-11.0
YELB E	117	-13.8	1.5		-16.4	-16.3	.....	-16.4
U		12.0	2.3		5.9	5.9	.....	5.8

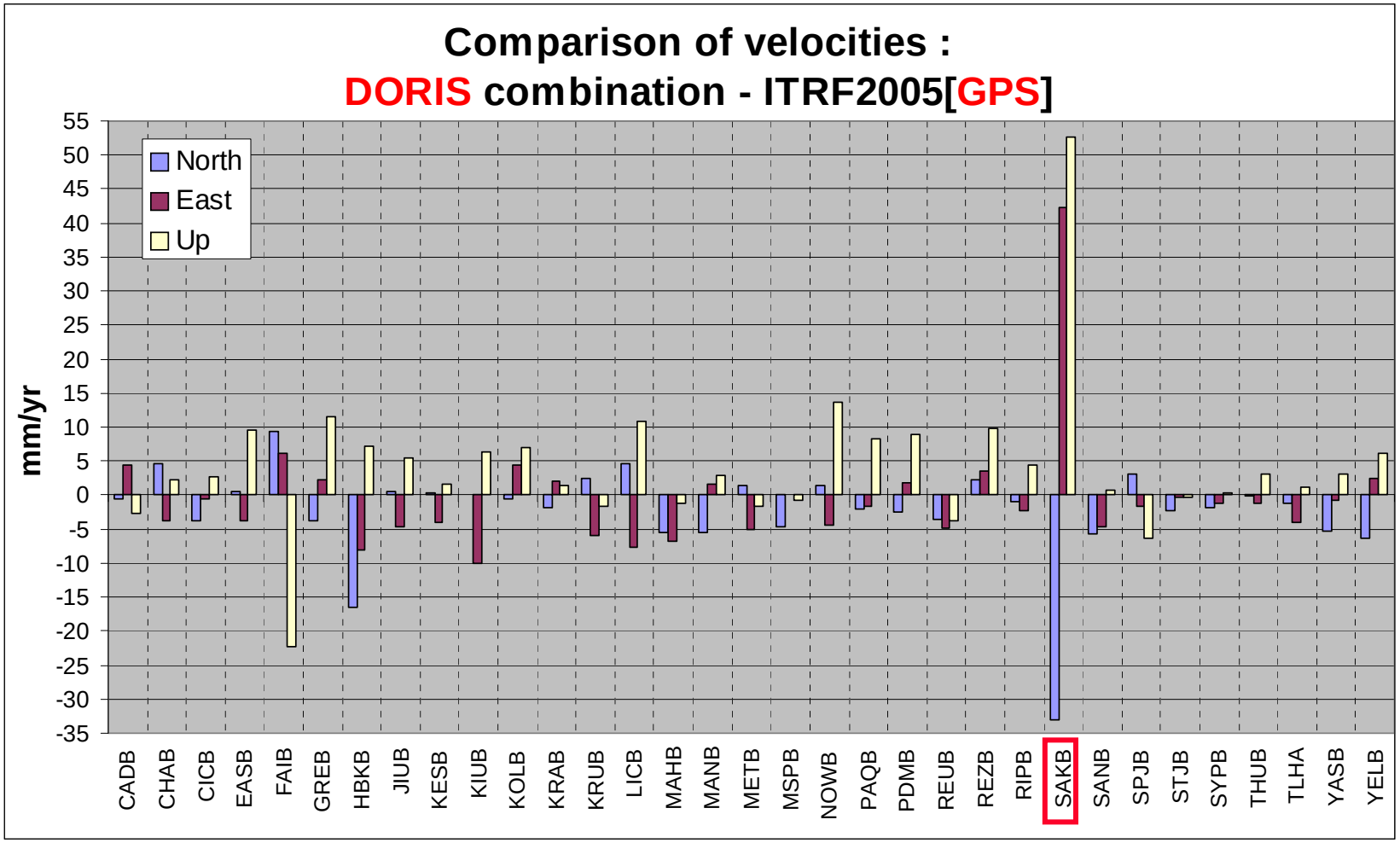
VLBI : avail.data in 1992

Results (2/5) – DORIS comparison



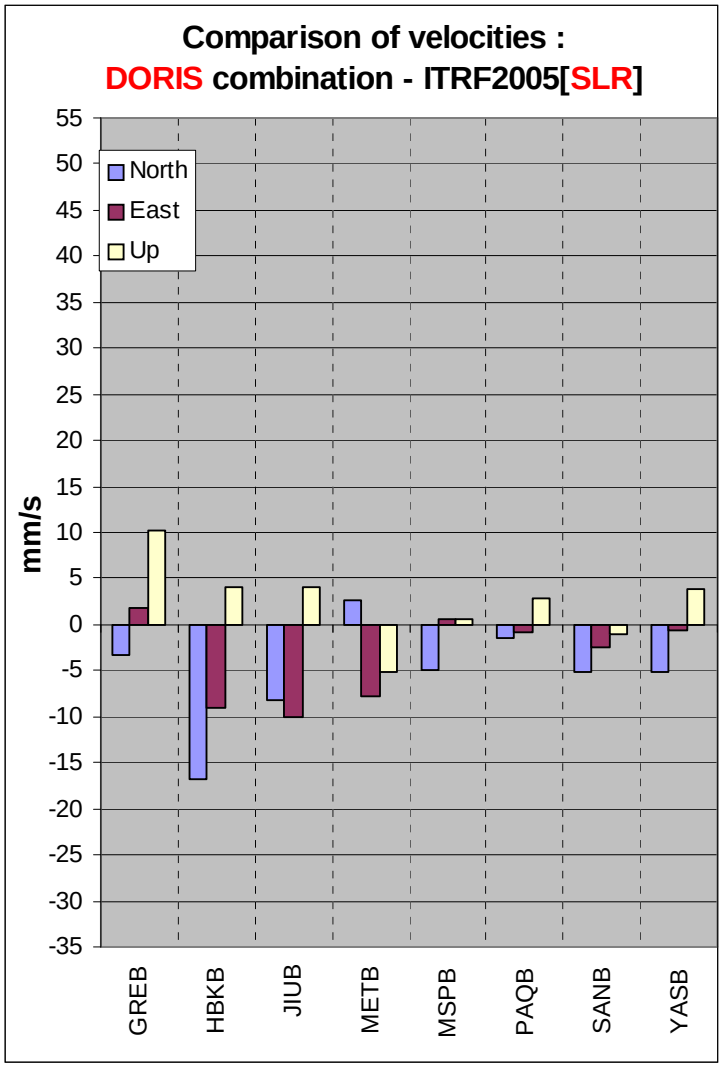
Problems with 3 stations : BEMB, LIBB and SAKB

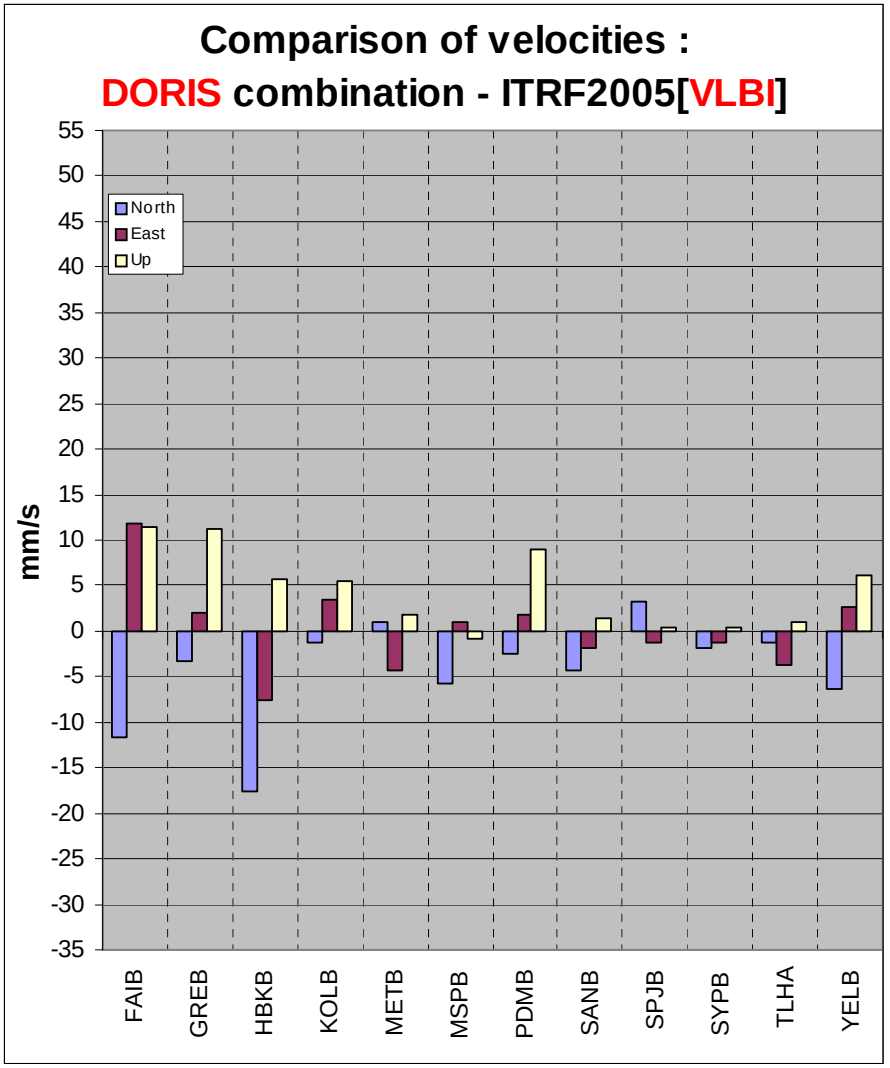
Results (3/5) – Colocation comparison



Problem with 1 station : SAKB

Results (4/5) – Colocation comparison





Results (5/5) – Statistics over the network

Statistics on the difference between the combined series velocities and ITRF 2005 velocities (after removing station(s) with obvious problems)

	DORIS			GPS			SLR			VLBI		
	m	σ	RMS	m	σ	RMS	m	σ	RMS	m	σ	RMS
N	-1.8	4.9	5.3	-1.4	4.4	4.6	-5.3	5.3	7.5	-4.3	5.4	6.9
E	-1.6	4.1	4.4	-1.8	4.0	4.4	-3.6	4.4	5.6	+0.2	4.7	4.7
U	+2.9	4.2	5.2	+4.6	4.4	7.1	+2.4	4.2	4.9	+4.5	4.2	6.1
3D			**8.6**			**9.5**			**10.5**			**10.4**

all velocities in mm/yr

- Consistency of the combined solution for colocated sites is ~10 mm/yr
- The upward velocity of the combined solution is over-estimated (bias of +2.4 to +4.6 mm/yr)

Future analysis

- Understand the origin of strong differences of velocities for some stations (BEMB/LIBB/SAKB)
- Analysis with the new combined series (new INASAN solution)