The new multi-year position and velocity solution SIR09P01 of the IGS Regional Network Associate Analysis Centre for SIRGAS (IGS RNAAC SIR)

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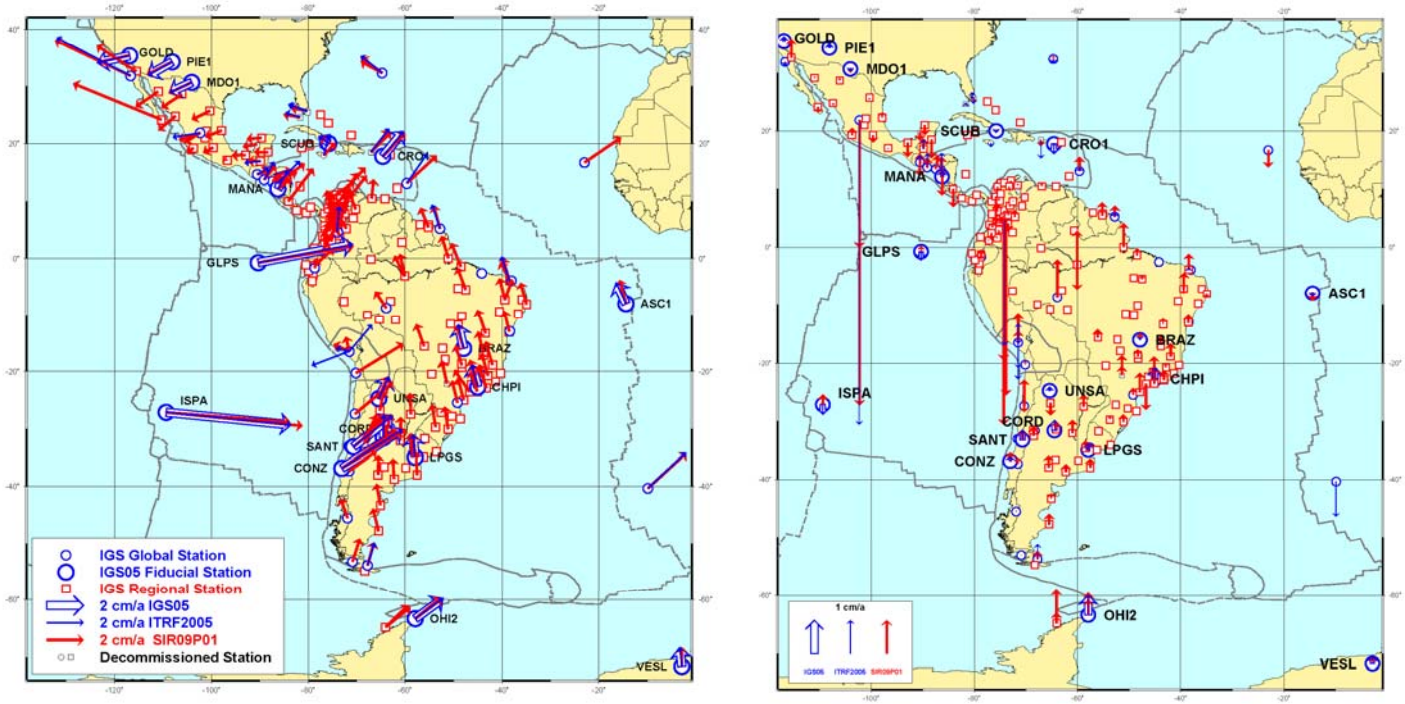

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Introduction

Periodically, at least once per year, the IGS RNAAC SIR at DGFI computes a new multi-year solution for the SIRGAS-CON network. The latest one, SIR09P01, was released on June 2009 and includes all weekly solutions provided by the SIRGAS analysis centres from **January 02, 2000 (GPS week 1043) to January 03, 2009 (GPS week 1512).** It is **referred to IGS05 at 2005.0** and provides **positions and velocities for 128 stations** (those operating more than two years). Its precision was estimated to be **better than ±0.5 mm (horizontal), ±0.9 mm (vertical)** for the coordinates at the reference epoch, and ±**0.8 mm/a for the linear velocities**. This presentation summarizes the main features of this solution SIR09P01.

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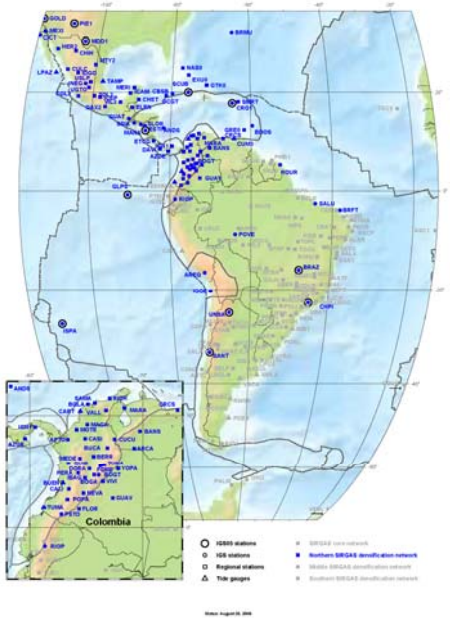
Changes to the previous multi-year solutions

- Until August 2008 (GPS week 1495) the loosely constrained weekly solutions for the SIRGAS Continuously Operating Network (SIRGAS-CON) were computed by DGFI in one adjustment only for the entire network. Afterwards the SIRGAS-CON network was divided into four sub-networks:
  - one core network covering homogeneously Latin America and the Caribbean (SIRGAS-CON-C), and
  - three densification networks (SIRGAS-CON-D) distributed at the northern, the middle and the southern part of the region
- The loosely constrained weekly solutions processed by the four SIRGAS Processing Centres are combined in an integral solution for the entire network, which is delivered to the IGS data centres as the final SIRGAS solution
- Three more years of observations (compared to the DGF08P01 solution) are included in the new solution SIR09P01, the total time span covers now the period from January 2000 to January 2009

Processed by IGAC (Colombia)



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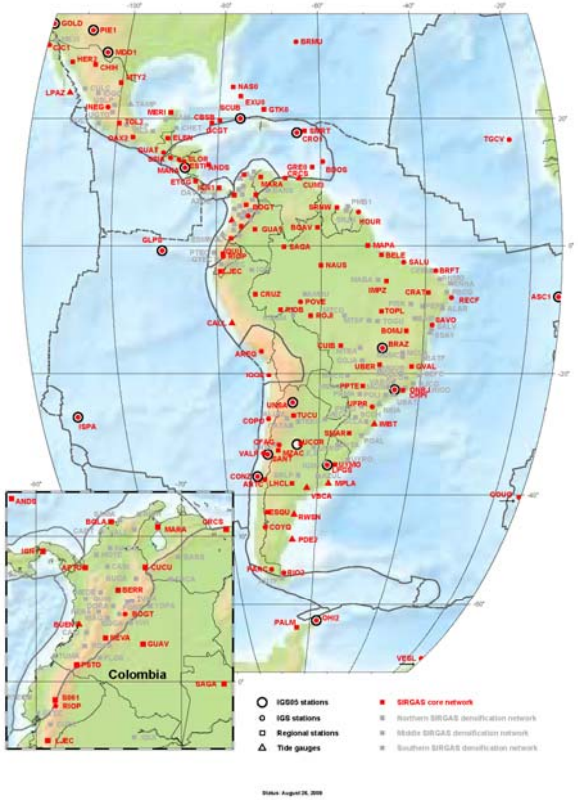


Processed by DGFI (Germany)

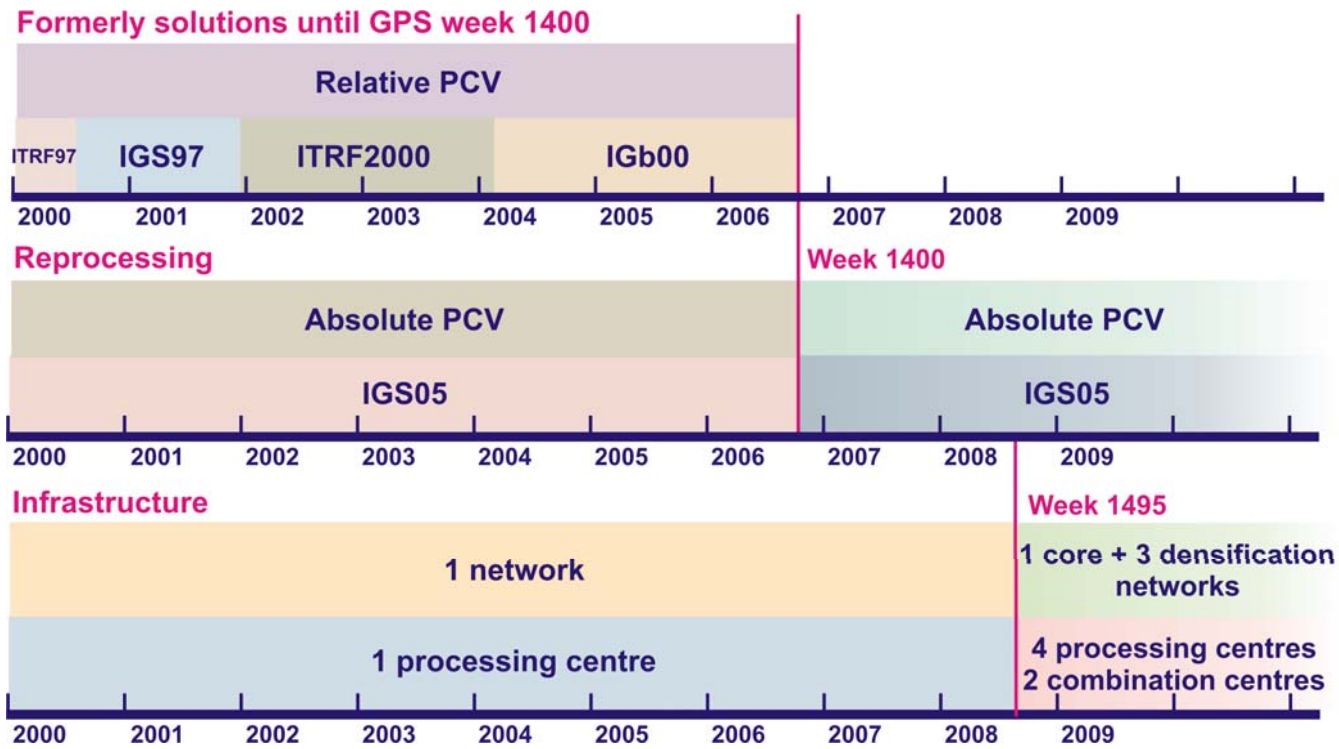
Processed by CIMA (Argentina)

Figure 1: The four SIRGAS sub-networks of the SIRGAS-CON network

Content

Input Data

- The input data for the generation of the multi-year solution SIR09P01 are the loosely constraint weekly solutions of the four SIRGAS Processing centres for the SIRGAS-CON network, combined in an integral solution for the entire network
- All weekly solutions from January 2000 to November 2006 have been reprocessed including absolute phase centre corrections and IGS05 as reference frame
- The main processing characteristics for the generation of loosely constrained weekly solutions are described in the DGFI Report 85 (available at ftp://ftp.dgfi.badw-muenchen.de/pub/gps/DGF/DGFI_Report85.pdf)



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Station Position and Velocity Solution SIR09P01

The computation of the multi-year solution includes the following steps:

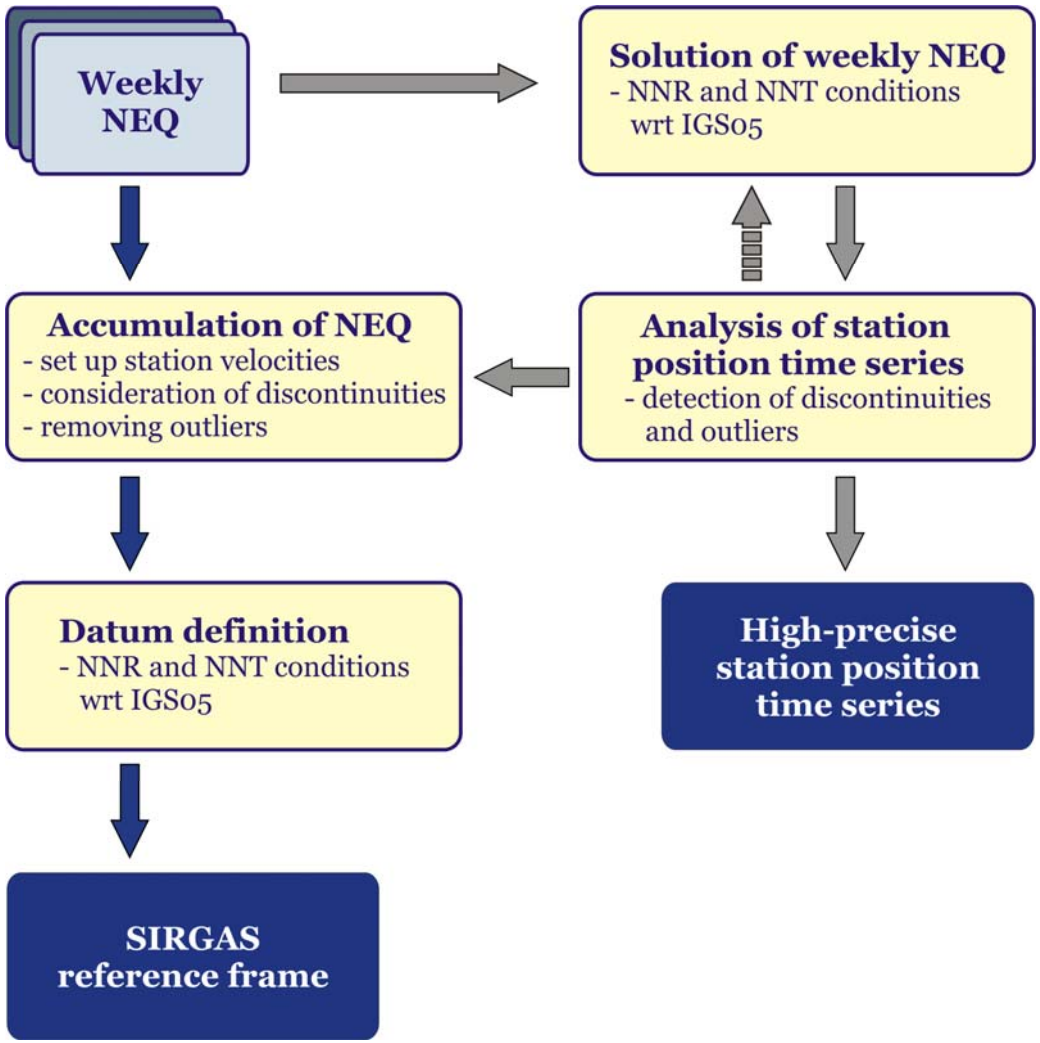
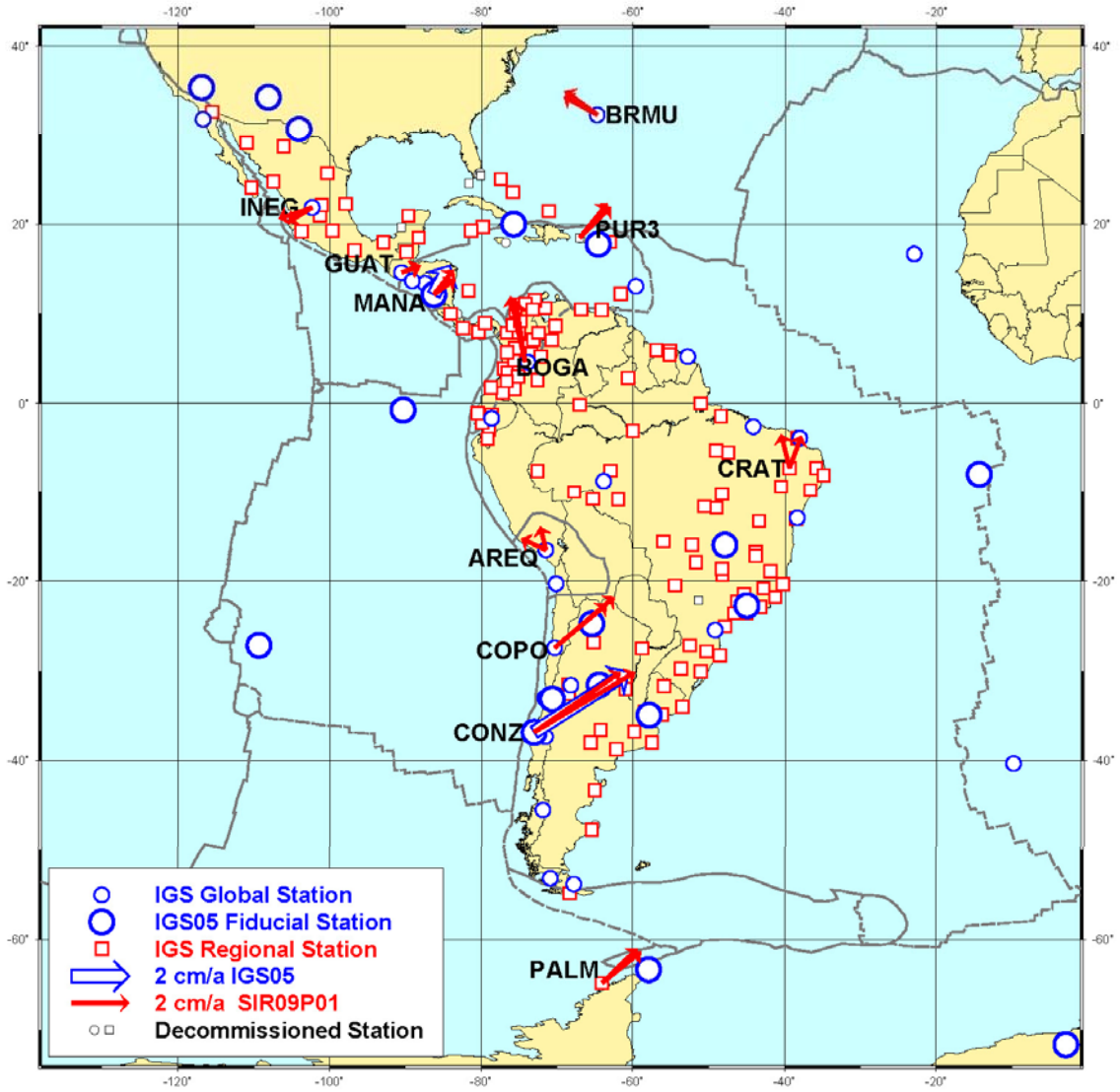
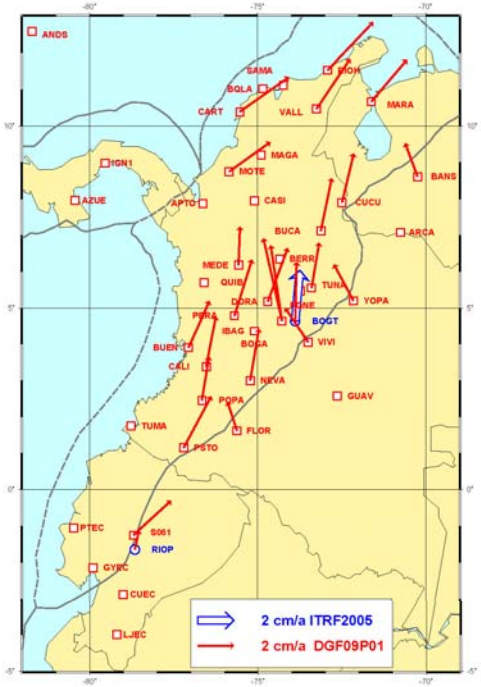


Figure 2: Identified discontinuities for eleven stations



- Precision of coordinates at reference epoch 2005.0 (derived from time series) N and E +- 0.8 mm, Up +- 0.9 mm
- Precision of velocities +- 0.8 mm/year



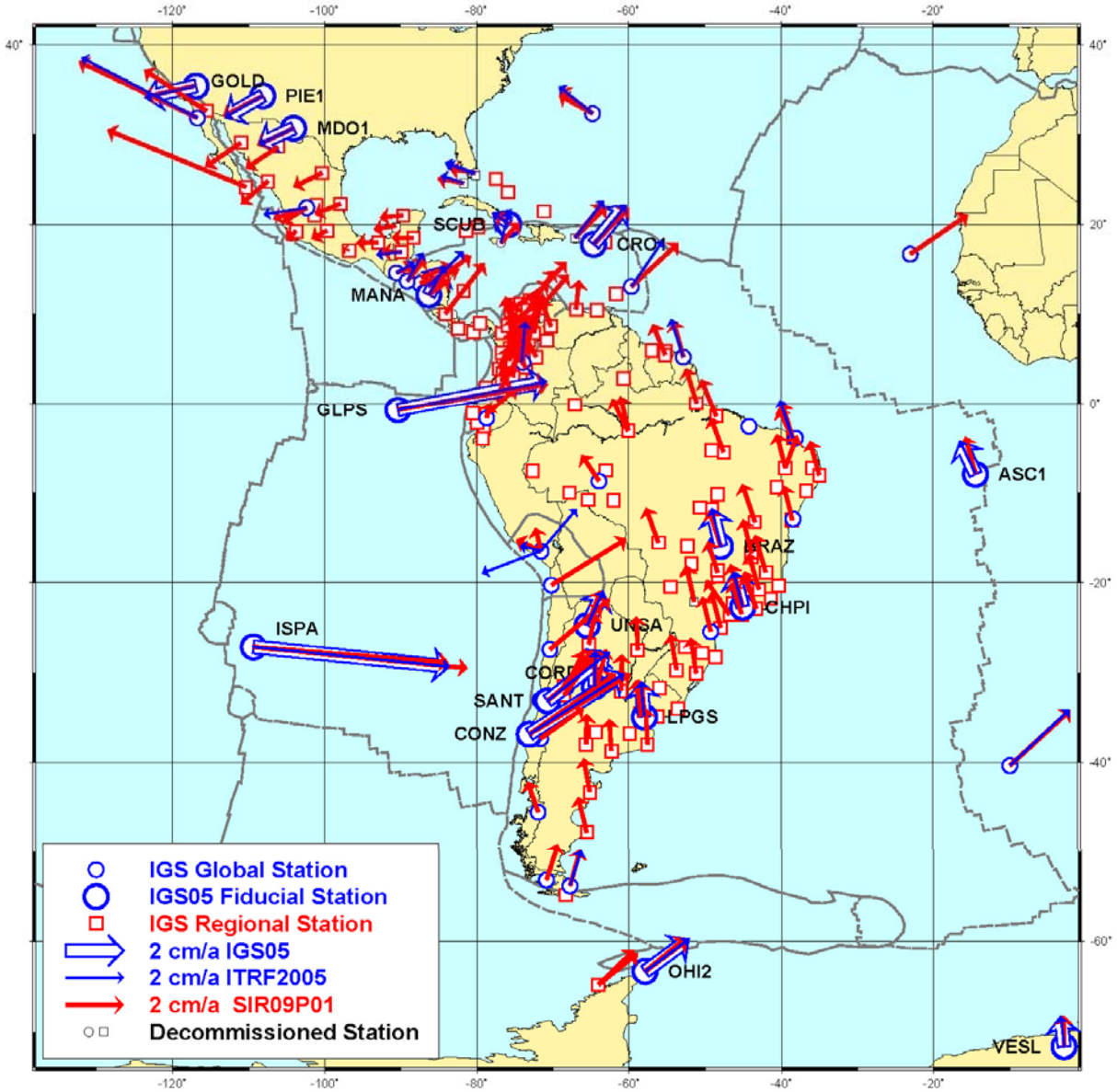
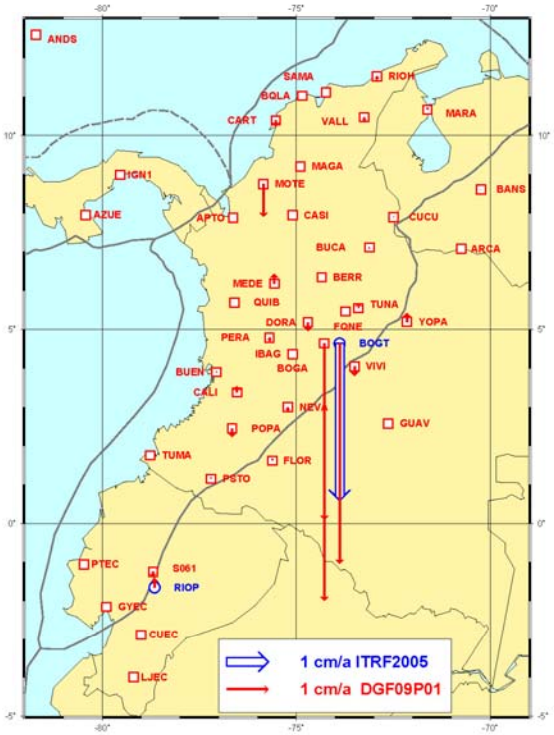
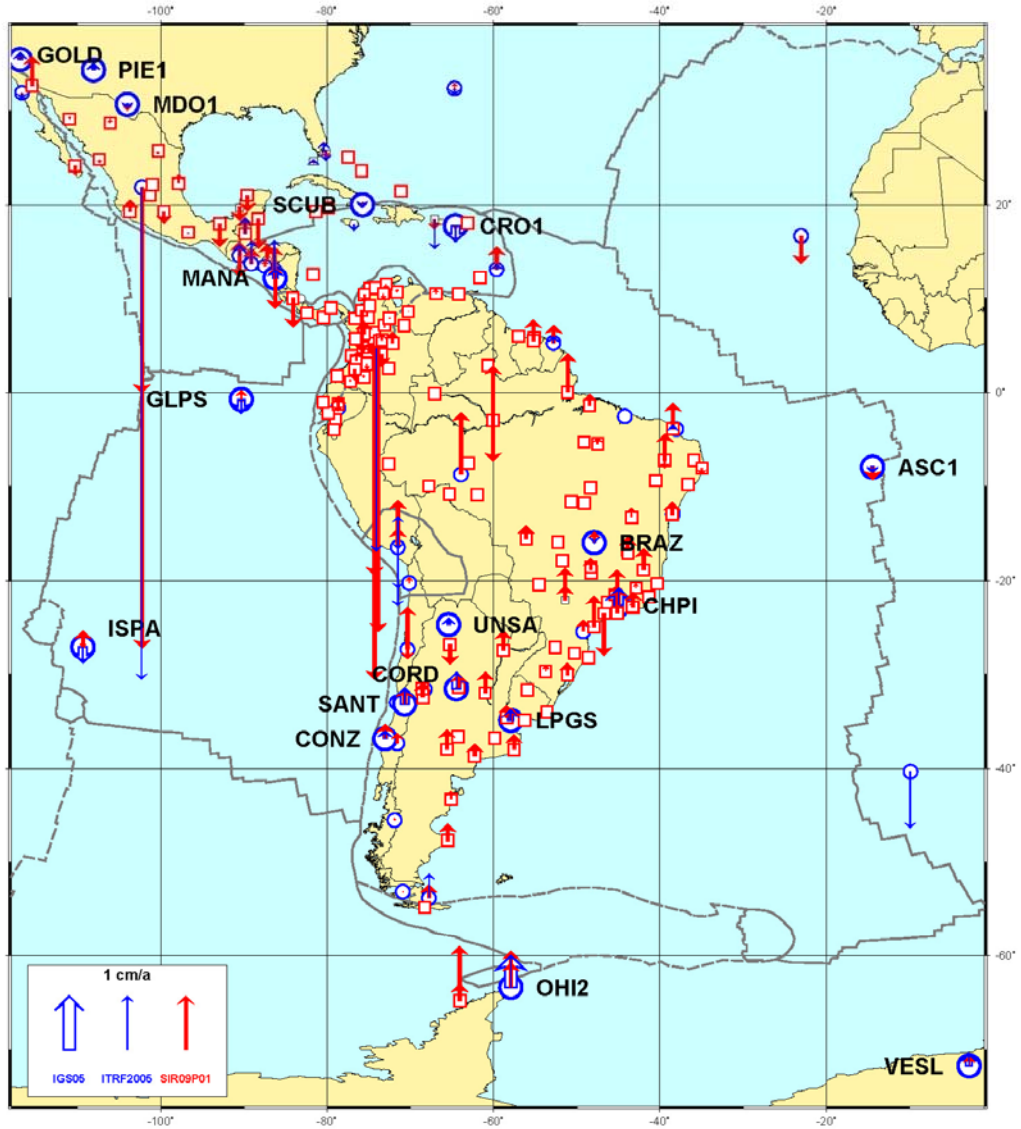


Figure 3: Horizontal velocities of SIR09P01 stations

- Precision of coordinates
  at reference epoch 2005.0
  (derived from time series)
  Up +- 0.9 mm
- Pecision of velocities
  +- 0.8 mm/year





Agreement with IGS05 in position: horizontal. ~ 2.0 mm , vertical: ~ 3.5 mm
in velocity: horizontal: ~ 0.5 mm/a, vertical: ~1.0 mm/a

Figure 4: Vertical velocities of SIR09P01 stations

Conclusions

- The SIR09P01 solution includes all weekly solutions from January 02, 2000 (GPS week 1043) to January 2009 (GPS week 1512)
- It is referred to IGS05, and the reference epoch is 2005.0
- It contains coordinates and velocities of 139 stations (11 stations with two sets of positions and velocities with defined time spans)
- The precision is estimated to be better than ±0.5 mm in the horizontal, ±0.9 mm in the vertical for the positions at the reference epoch, and ±0.8 mm/a for the linear velocities