# The future global VLBI2010 network of the IVS

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VLBI2010 Project Executive Group

IVS General Meeting 2012, Madrid, Spain, March 4-8, 2012

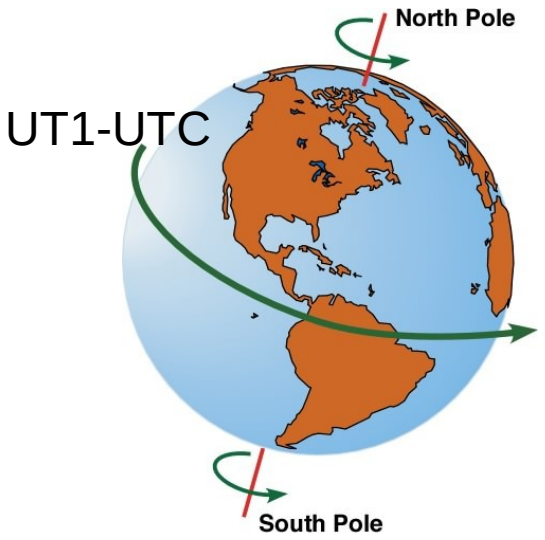
2002

# Primary Goals of IVS-WG2

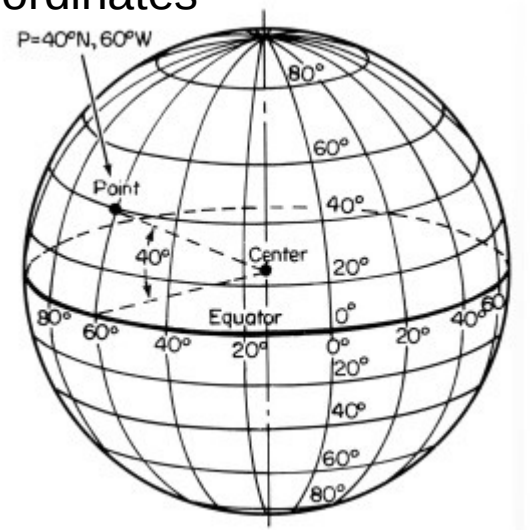
## Product Specifications and Observing Programmes

Products requiring continous observations (**24h/7d**):

- EOP: UT1-UTC, polar motion, nutation
- TRF: coordinates, episodic events
- physical parameter: troposphere, ionosphere




coordinates





http://ivscc.gsfc.nasa.gov/about/wg/wg2/index.html

# VLBI2010 in a nutshell

2006

- continuous observation (24h/7d) in 30s slew/track cycles
- very fast radio telescopes, ≥12m reflector class
  - kinematic parameters: $v_{Az}$=12°/s, $v_{El}$=6°/s, $a_{AzEl}$=3°/s²
  - construction: 1 mm position, 0.1 mm/year velocity over lifetime (>20 years)
- wideband feed, 2-14 GHz (2-18 GHz)
- digital baseband converter
- high-sampling data acquisition rate, ≥ 8Gb/s
- e-transfer, e-VLBI
- distributed remote controlled continuous operation
- software correlator
- automated (combined) analysis

# Why VLBI2010?

- IVS is a Service of International Association of Geodesy (IAG).
- IAG contributes to the Global Earth Observing System of Systems (GEOSS) with the Global Geodetic Observing System (GGOS) .
- GGOS goal is to reach on a global scale:
  - 1mm position accuracy, 0.1mm/yr velocity accuracy
  - continuous observations
  - availability of results in near real-time

**The realization of GGOS requires the application of the VLBI2010 concept to IVS components.**

# V2PEG

> 2009

- The IVS Directing Board decided on March 23, 2009, to establish the IVS VLBI2010 Project Executive Group.
- It will provide strategic leadership to the VLBI2010 project and guide the transition from the VLBI2010 development phase to the VLBI2010 implementation phase.
- Activities:
  - presentations, workshops
  - letters of support, consulting
  - telecons, monitoring of VLBI2010 activities

# IVS Network Station Survey

December 2010

Objectives:

- gather information about VLBI2010 plans,
- trigger VLBI2010 discussion at network station level,
- get input on what the V2PEG can do to best support individual VLBI2010 projects.

Survey was updated in December 2011.

31/31 network station responded to the survey.

An analysis report was redistributed to the IVS network stations in January 2011.

http://ivscc.gsfc.nasa.gov/technology/vlbi2010-docs/ns-survey2010.pdf

# Six Questions

1. Specify plan to upgrade your site to full VLBI2010 capability.
2. Do you plan to acquire a new radio telescope that fully meets VLBI2010 recommendations?
3. Do you plan to continue operating your existing legacy radio telescope in the future?
4. What is the best estimate of the year in which your VLBI2010 capability will become operational?
5. At what stage are you in the planning process?
6. What support do you need from the IVS?

# IVS V2PEG Event

IVS Workshop on

**VLBI2010 Technical Specifications**

Bad Kötzting / Wettzell

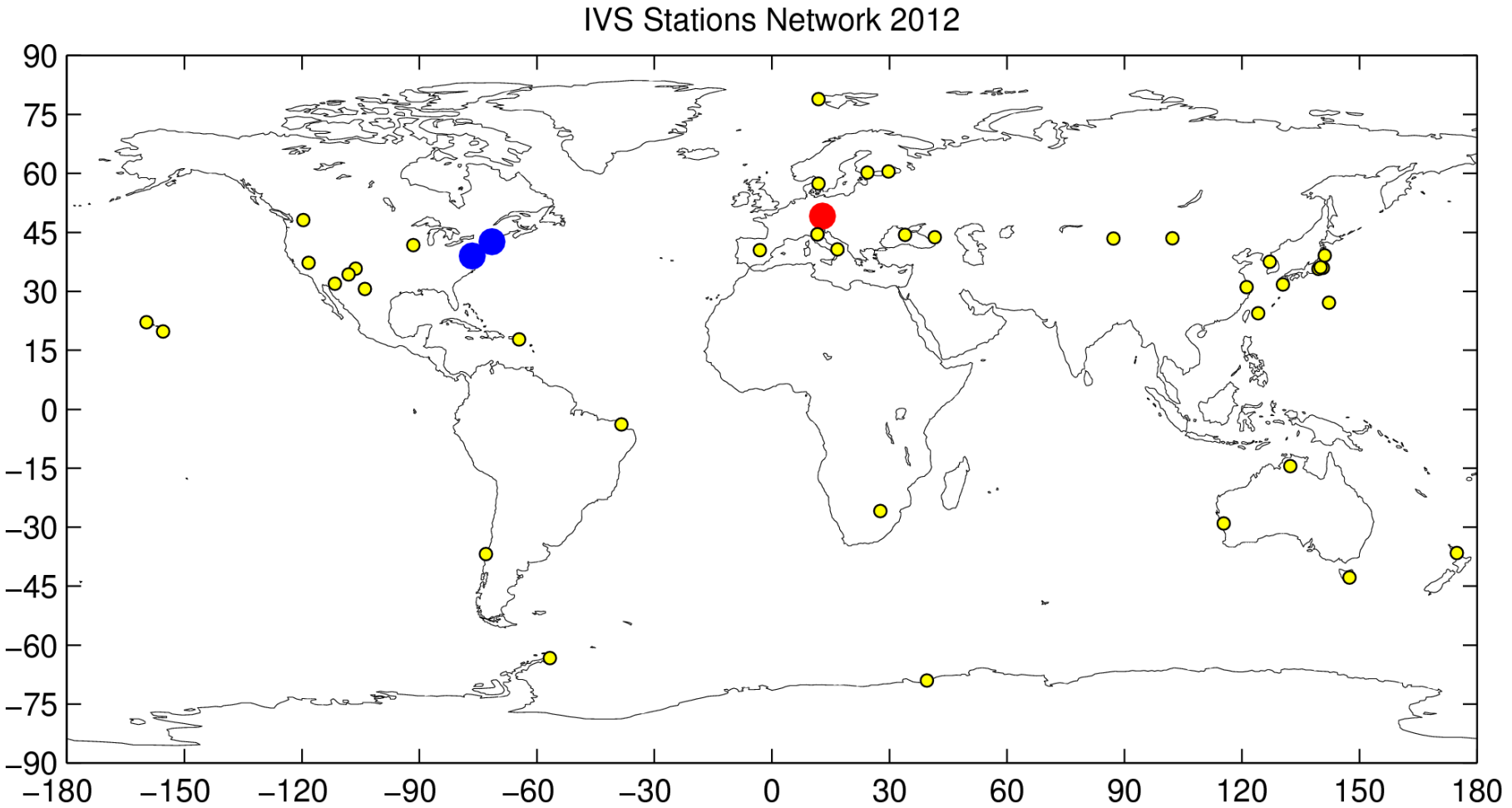
March 1, 2012: Front End, Back End

March 2, 2012: Radio Telescopes (Twin-Demo)

94 participants, 19 countries

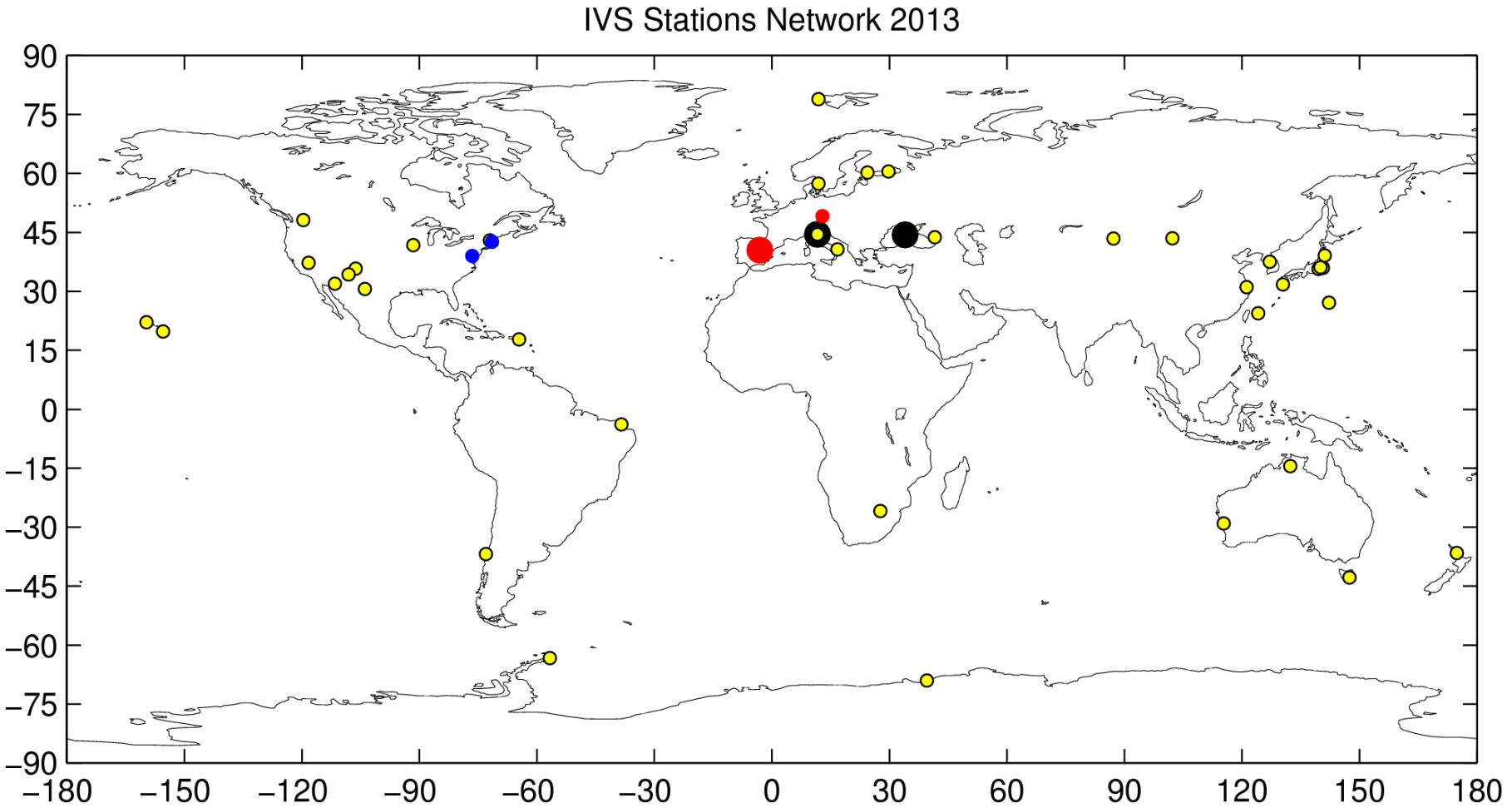
TwinTelescope Wettzell

# VLBI2010 Network in 2012




- S/X radio telescope
- VLBI2010 upgraded legacy radio telescope
- VLBI2010 new fast radio telescope
- VLBI2010 new very fast radio telescope

# VLBI2010 Network in 2013

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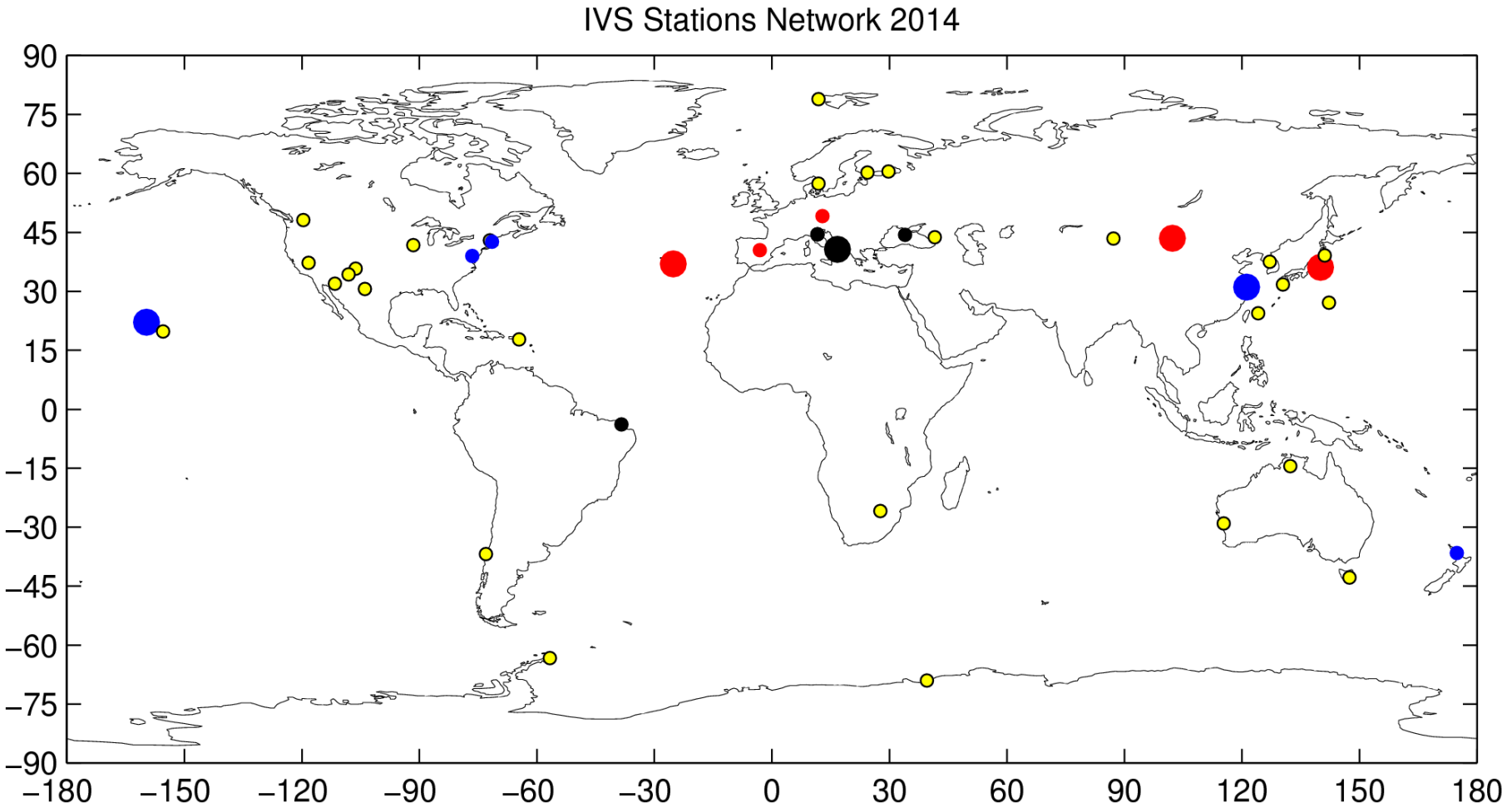
# VLBI2010 Network in 2014

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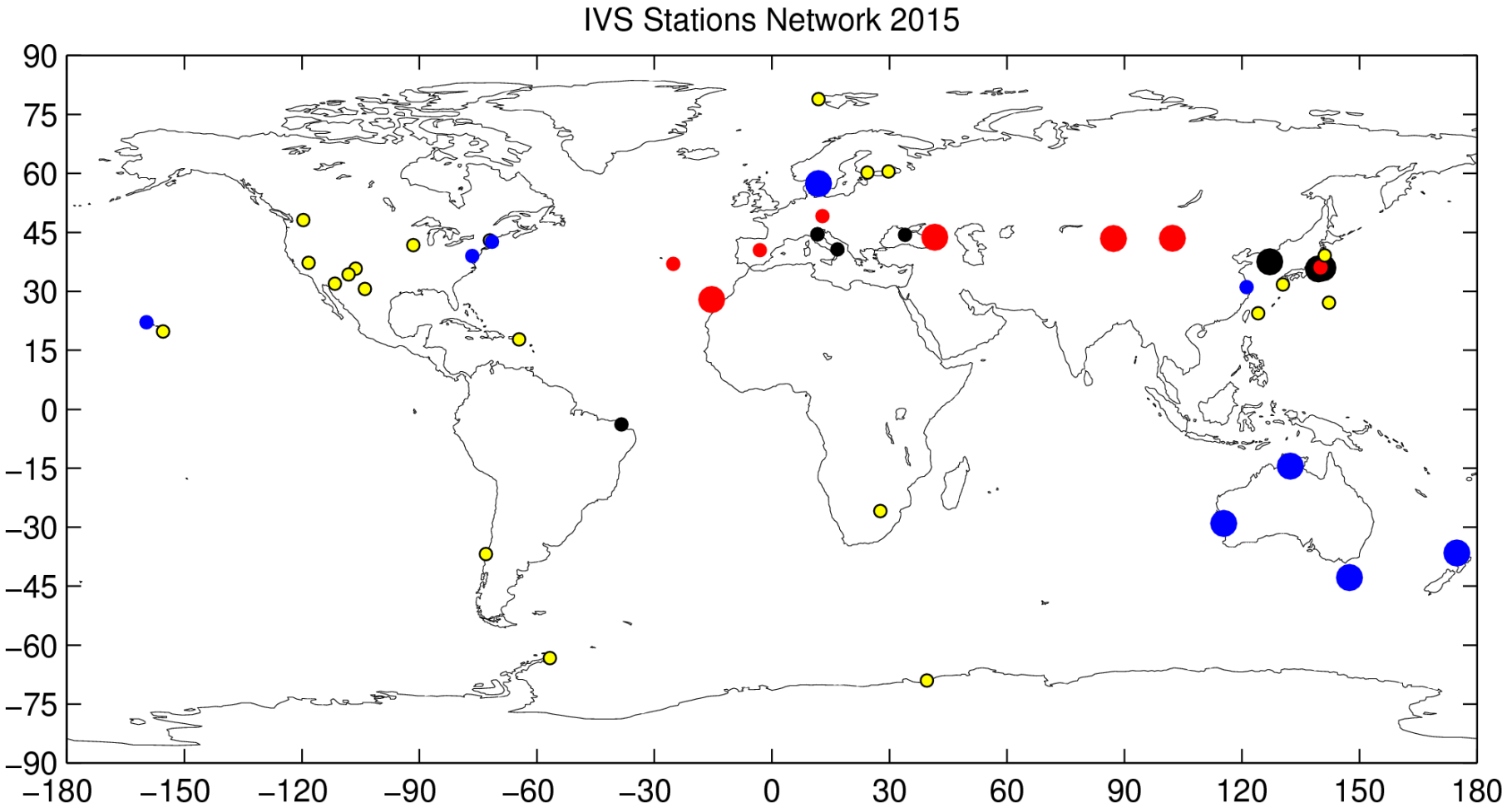
# VLBI2010 Network in 2015

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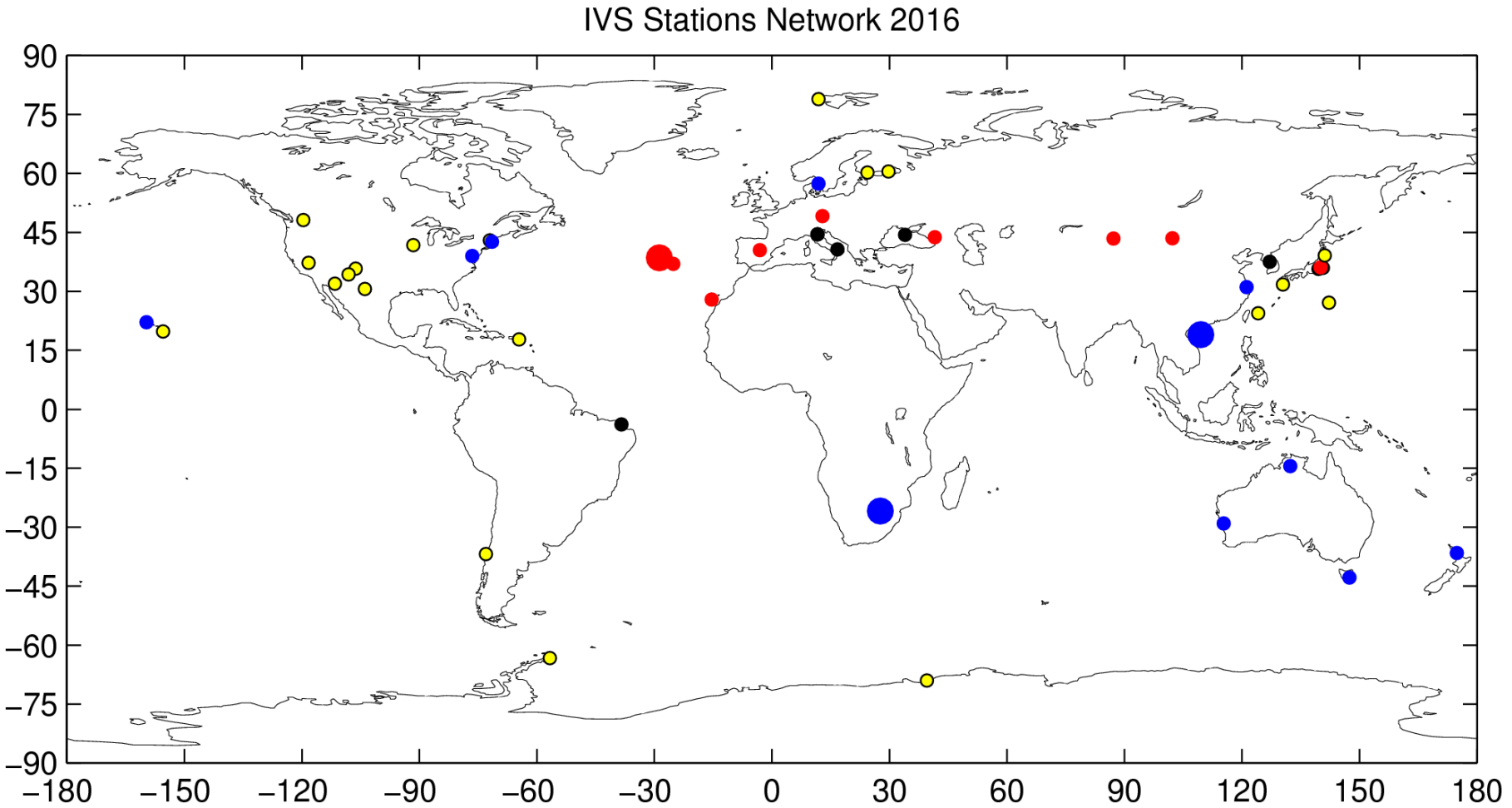
# VLBI2010 Network in 2016

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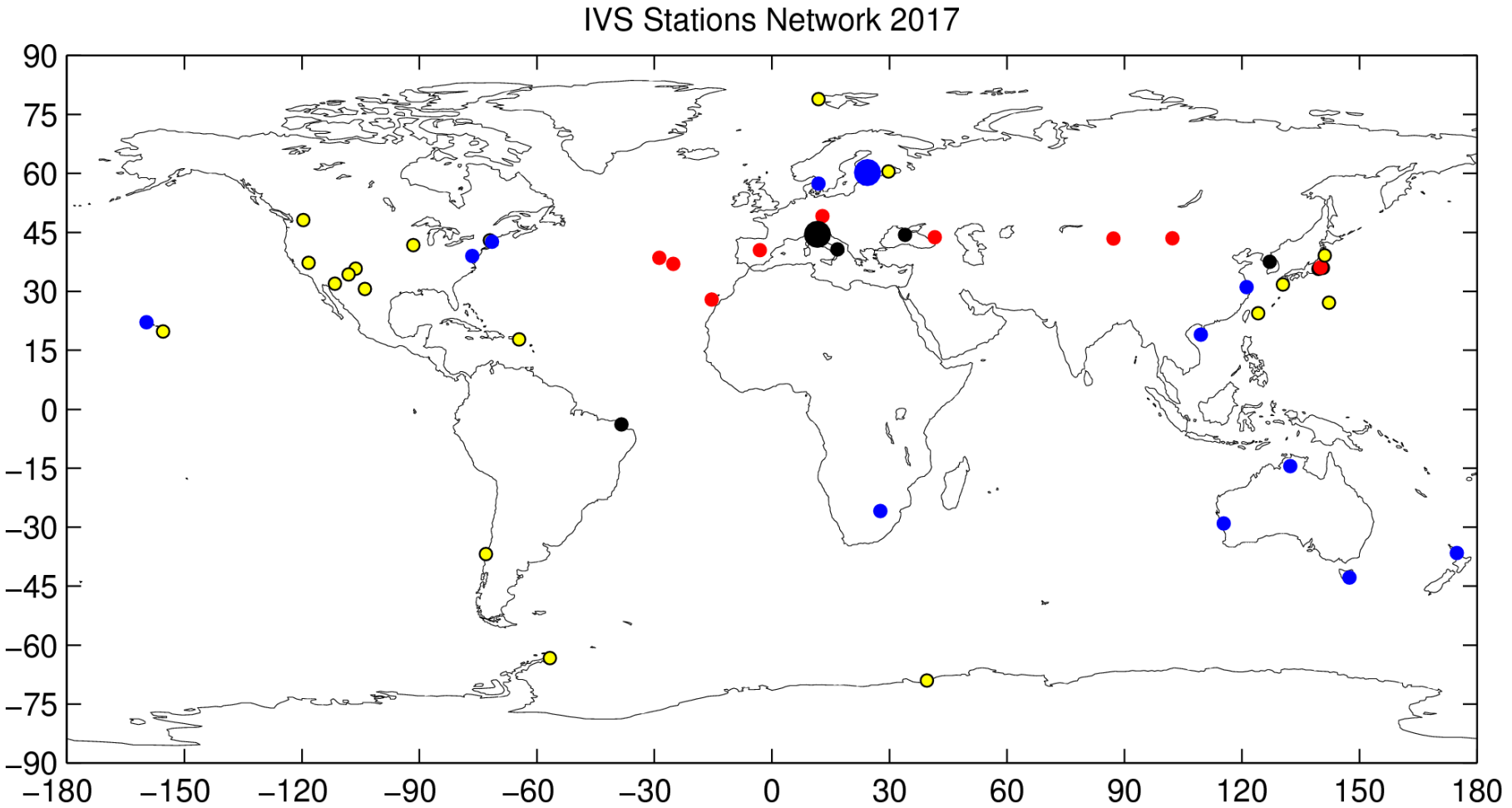
# VLBI2010 Network in 2017

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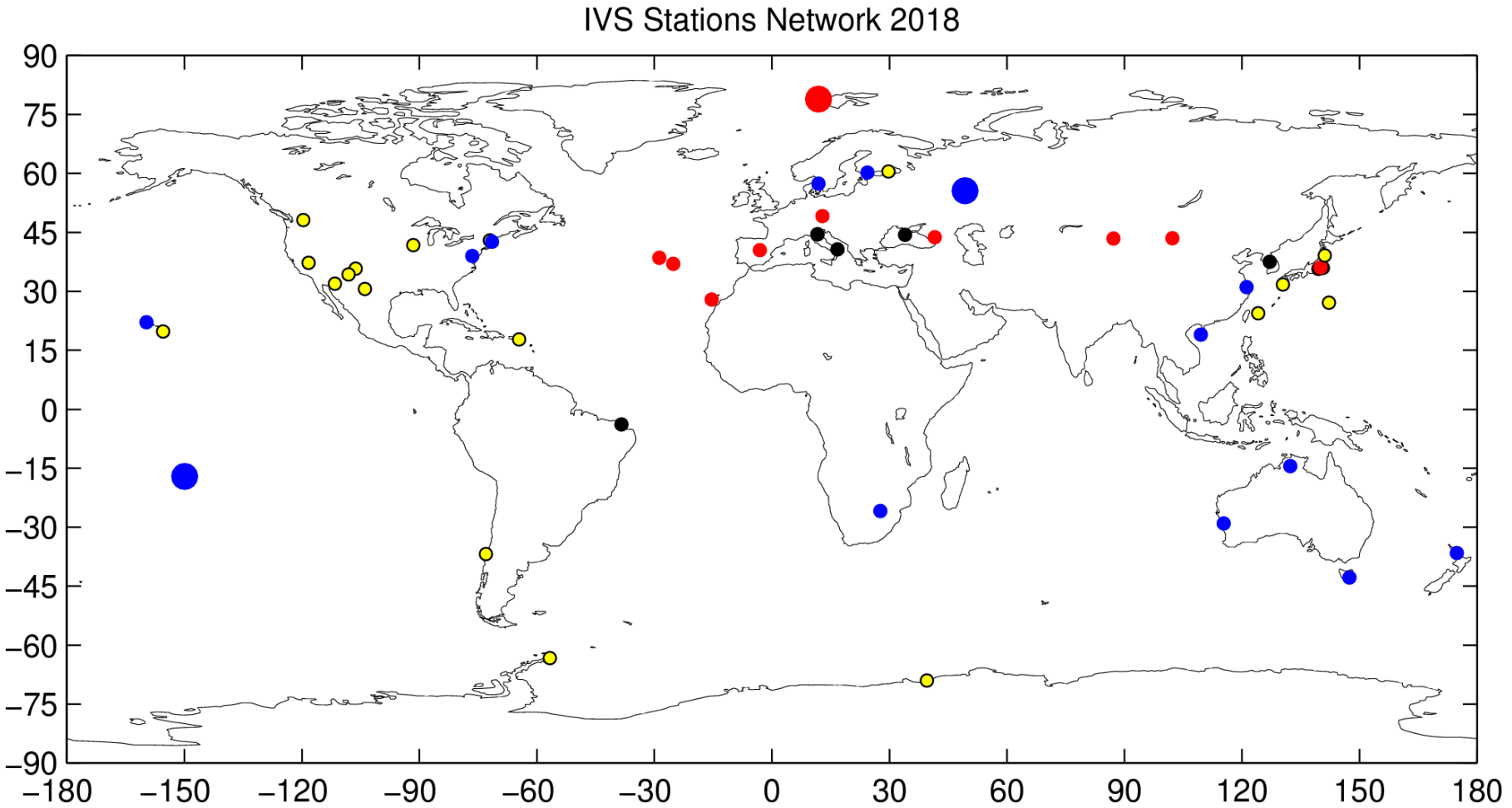
# VLBI2010 Network in 2018

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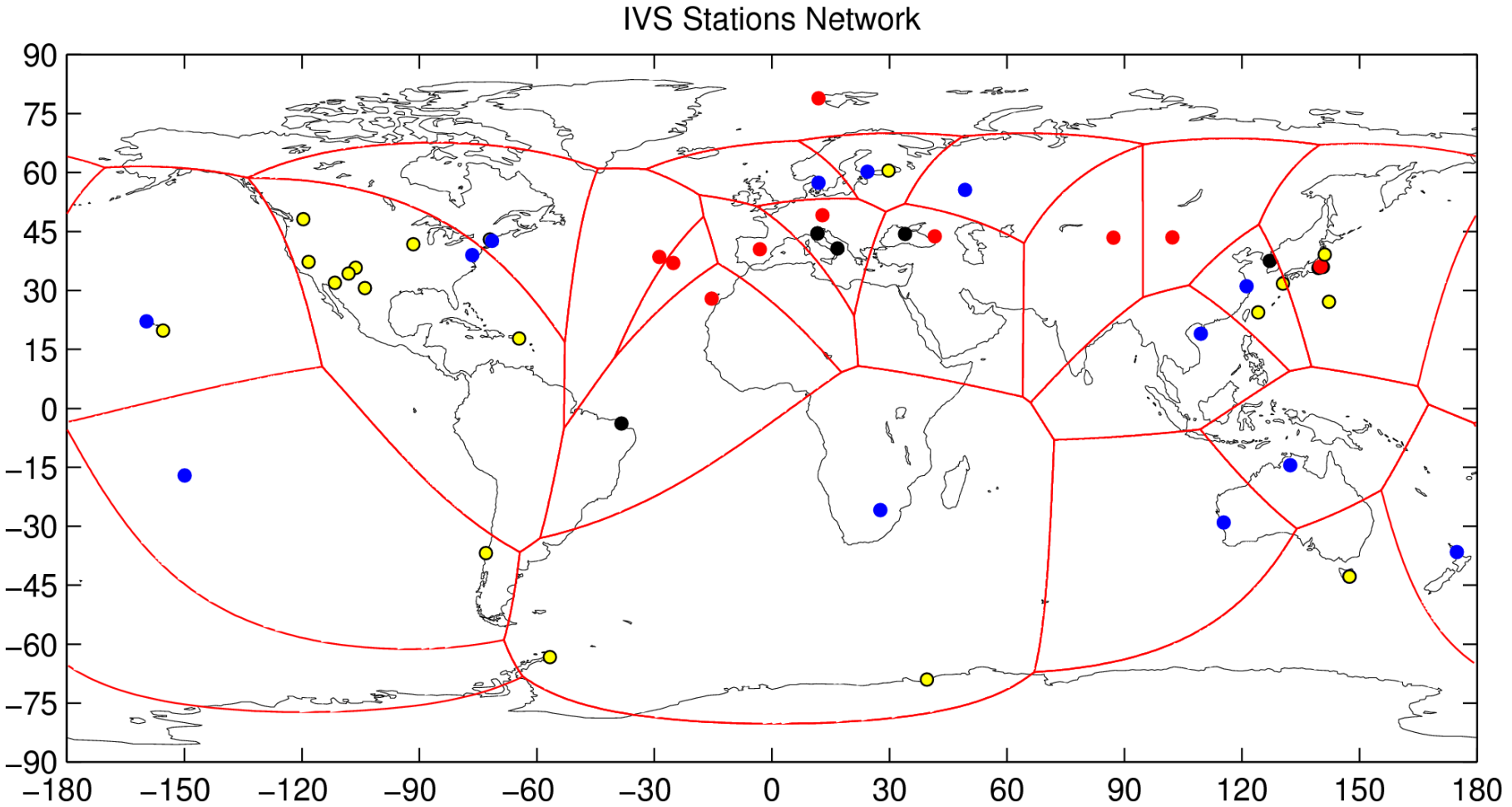
# VLBI2010 Network in 2018

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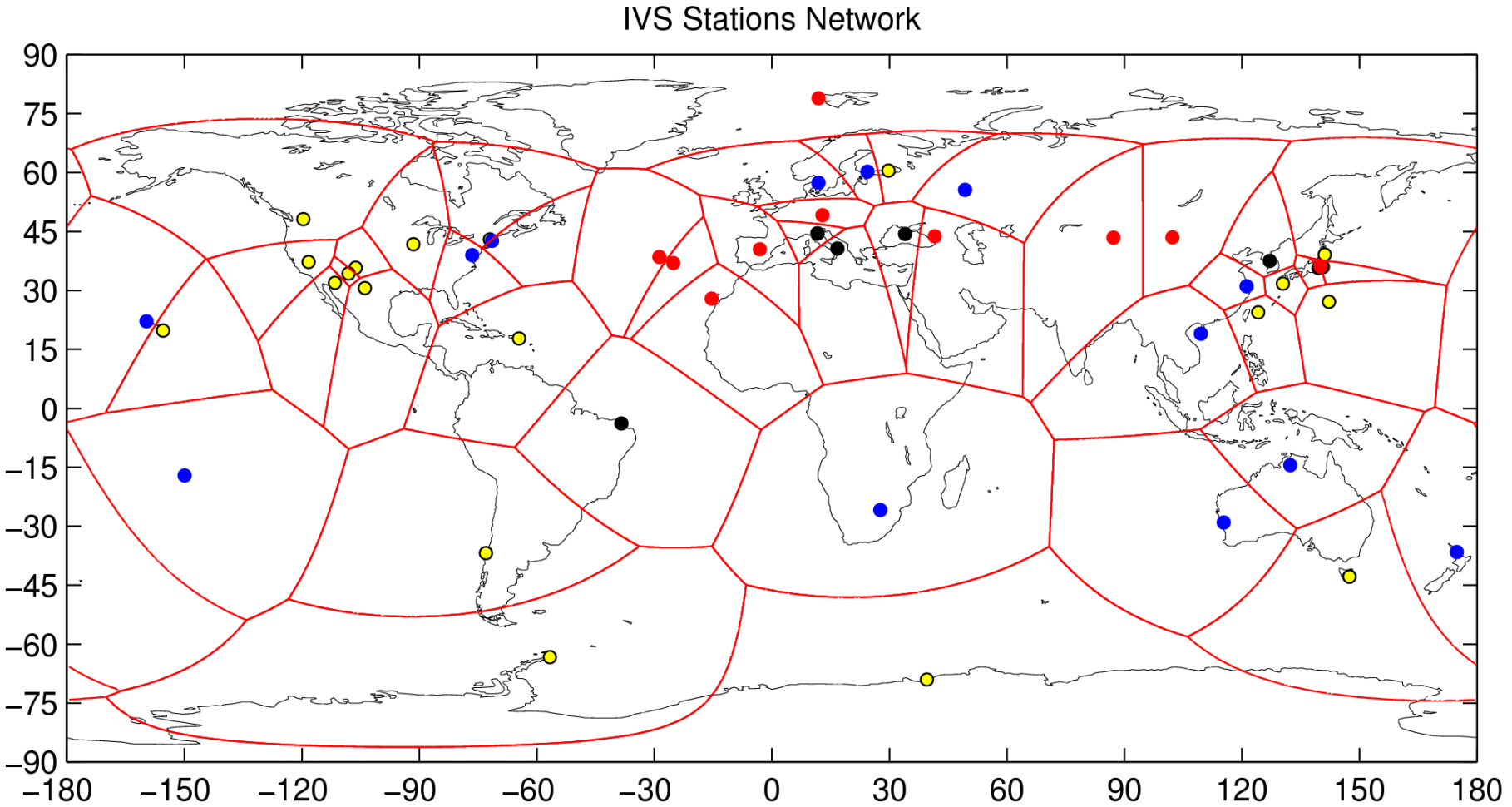
# IVS Network in 2018

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# Survey Summary VLBI2010

- 20 new radio telescopes at 17 sites with full VLBI2010 compliance should become operational by 2017.
- Additional new stations might join in.
- 13 radio telescopes will operate with partial VLBI2010 compliance.
- By 2014/2015 a sufficient number of VLBI2010 compatible radio telescopes will be available for initial VLBI2010 operations.
- The American/Pacific region will lack presence of VLBI2010 network stations.

# Conclusions

- IVS will implement the VLBI2010 concept within this decade successfully.
- The S/X operation mode will be maintained in parallel to the VLBI2010 operation at least until 2015.
- Large legacy radio telescopes will continue to be used for astrometry, space applications, and data continuity into the future.
- In the long term VLBI2010 will significantly outperform the current standard S/X operation.
- IVS will meet the goals of GGOS only by a new global infrastructure based on VLBI2010.