University of Burundi
ICT Department

International Meeting on the Applications of Global Navigation Satellite Systems (GNSS)

Vienna 12-16 December 2011

Enhancing GNSS accuracy and availability in inter-tropical zone

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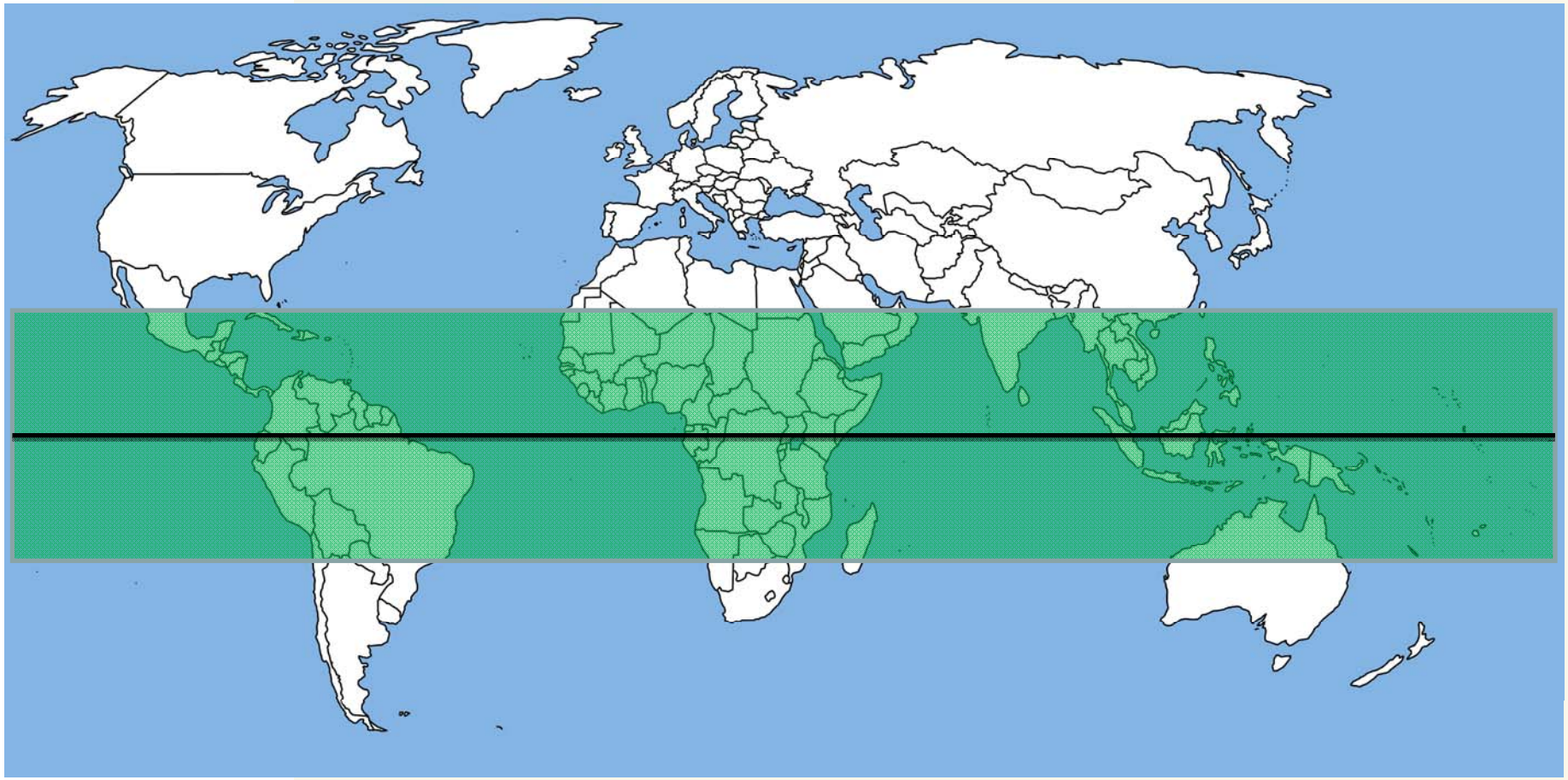

Contents

- Why intertropical zone?
- Specific errors
- Some solutions…
- Perspectives

1. Why Inter-tropical zone is particular?

- Most of developing countries with no space programs
- There is no augmentation systems,
- Isolated cities, villages,…
- Lack of telecoms infrastructures
- Most of countries do not have CORS network

1. Why Inter-tropical zone is particular?

- Mineral prospecting and exploration
- Tracking sudden population movements (conflicts, diseases, natural disaster,…)
- Monitoring forest damage in tropical regions,
- Higher impact of the 2012-13 maximum solar activity

2. Specific errors

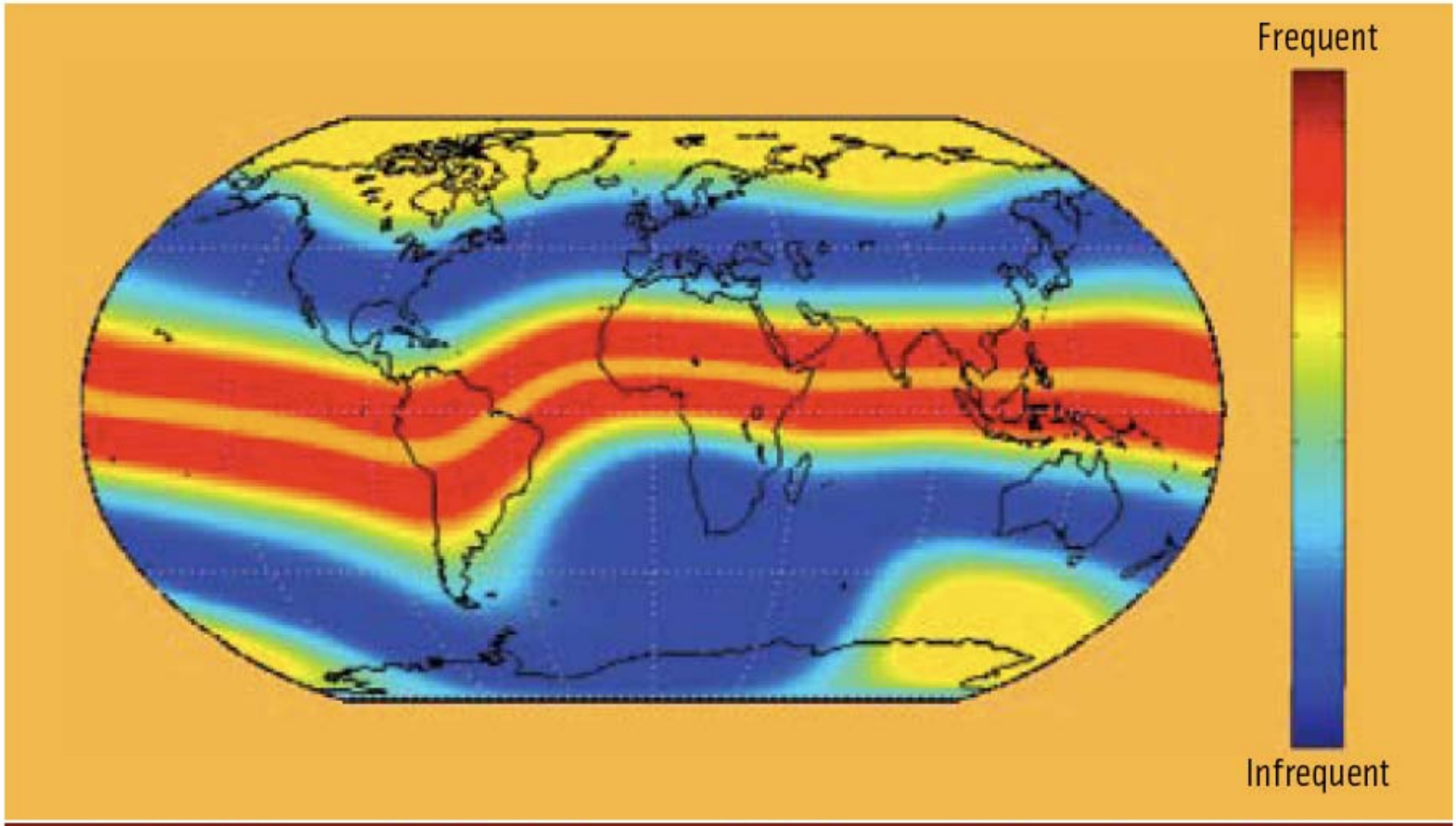

FIGURE 1 Scintillation map showing the frequency of disturbances at solar maximum. Scintillation is most intense and most frequent in two bands surrounding the magnetic equator, up to 100 days per year. At poleward latitudes, it is less frequent and it is least frequent at mid-latitude, a few to ten days per year.

Source: Kintner, P.M., Jr., T.E. Humphreys, and J.C. Hinks, "GNSS and Ionospheric Scintillation: How to Survive the Next Solar Maximum", Cover story of *InsideGNSS*, July/August 2009.

3. Some solutions…

To enhance GNSS accuracy:

- Specific ionospheric model for intertropical zone,
- New filtering methods for receivers. Sequential Monte Carlo Methods have proved efficiency in multipath error estimation,
- More ground reference stations,
- …

4. Perspectives

- To raise and promote discussion on the issue,
- Looking for research partnerships/collaborations around the world,
- The role of ICG and the regional centers,
- Initiating projects for GNSS accuracy and ionospheric scintillation on tropical regions,
- …

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Thank you!