

A micro view to en-route delays

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Seddik Belkoura^{1,2} Massimiliano Zanin^{1,3}

¹Innaxis Foundation & Research Institute, Madrid, Spain
{sb, mz}@innaxis.org

²Universidad Politécnica de Madrid, Madrid, Spain
jmpena@fi.upm.es

³Universidade Nova de Lisboa, Lisboa, Portugal



Introduction

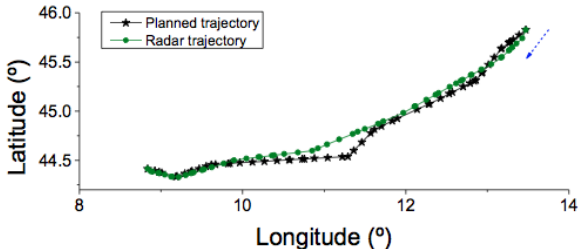
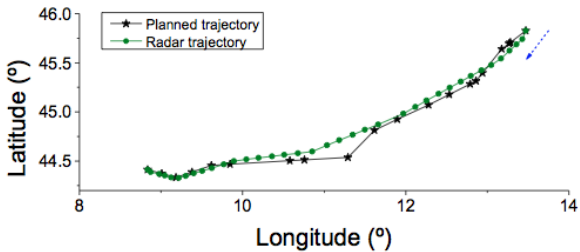
A novel way to analyze non ATFM delay across the en-route system (as a tool to identify his causes), including a measure of "resilience" to disturbances that cause delay.

Introduction

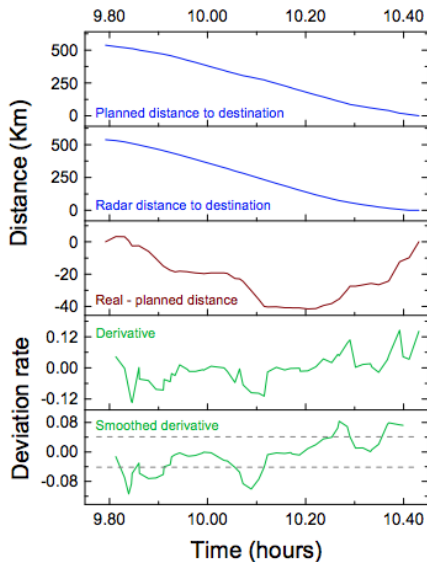
A novel way to analyze non ATFM delay across the en-route system (as a tool to identify his causes), including a measure of "resilience" to disturbances that cause delay.

Specifically, this computational framework follows a flight trajectories (planned and realized) to detect all delay-generating events, i.e. events that affect the delay of a flight both positively or negatively.

Interpolation



Events identification

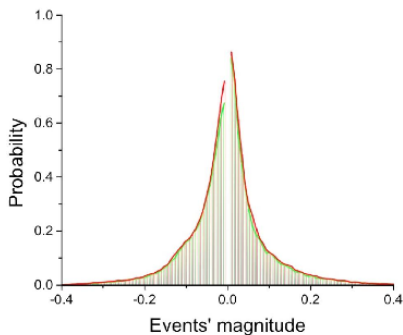


Metrics

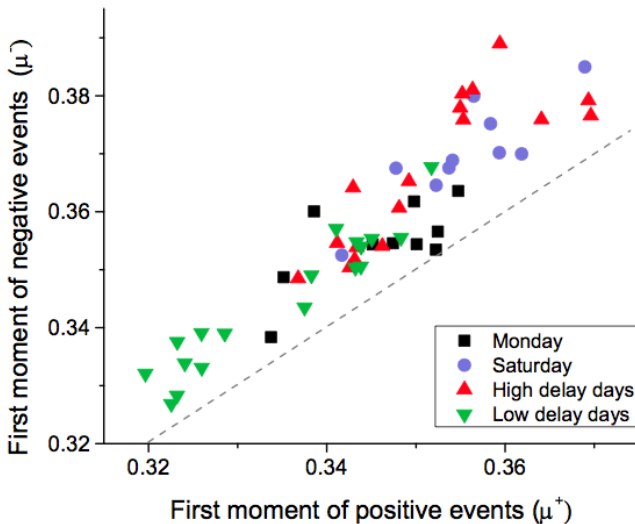
$$\mu^+ = \sum_{\tau > 0} \tau * p(\tau) \quad (1)$$

and

$$\mu^- = \sum_{\tau < 0} \tau * p(\tau) \quad (2)$$



System's Resilience



Geographical distribution of events

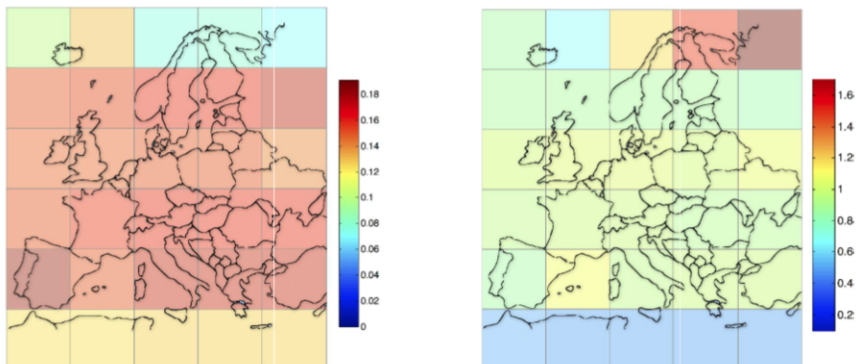


Figure : Spatial distribution of μ^+ (left) and spatial resilience metric distribution (right)

Future Challenges

- Analysis of the magnitude of positive and negative events, as for instance the number of negative events needed to counteract a single positive one
- Detection of causal spatio-temporal patterns in the distribution of delay-generating events
- Analysis of systems in which most of the delays are handled in the air, like the US airspace.

Thank you

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sb@innaxis.org

