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RESEARCH ON SPACE WEATHER EFFECTS ON GNSS PERFORMANCE IN CROATIA

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Filjar, Cander, Kos: Research on space weather effects on GNSS performance in Croatia

- Content of presentation:
  - Introduction
  - Space weather effects on GNSS performance
  - Related research activities in Croatia
  - Outcomes of GNSS-SW research in Croatia
  - Near-term extension of research scope
  - Conclusion

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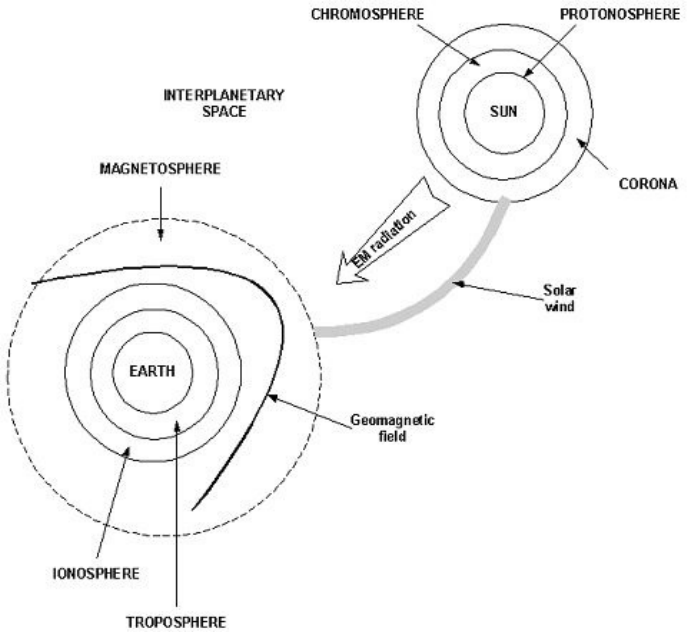
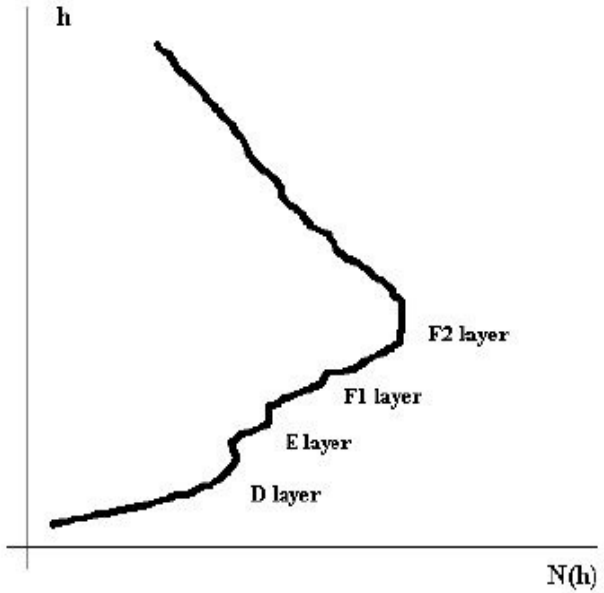
- Space weather effects on GNSS
  - Space weather
  - Earth-related environment
  - SW effects on GNSS





Error source	Equivalent positioning error (bias – random - total) [m]
Satellite and control component errors	
Satellite ephemeris error	2.1 – 0.0 – 2.1
Satellite clock error	2.0 – 0.7 – 2.1
User component errors	
Multipath	1.0 – 1.0 – 1.4
Receiver noise	0.5 – 0.2 – 0.5
Propagation media errors	
Ionospheric delay	4.0 – 0.5 – 4.0
Tropospheric delay	0.5 – 0.5 – 0.7

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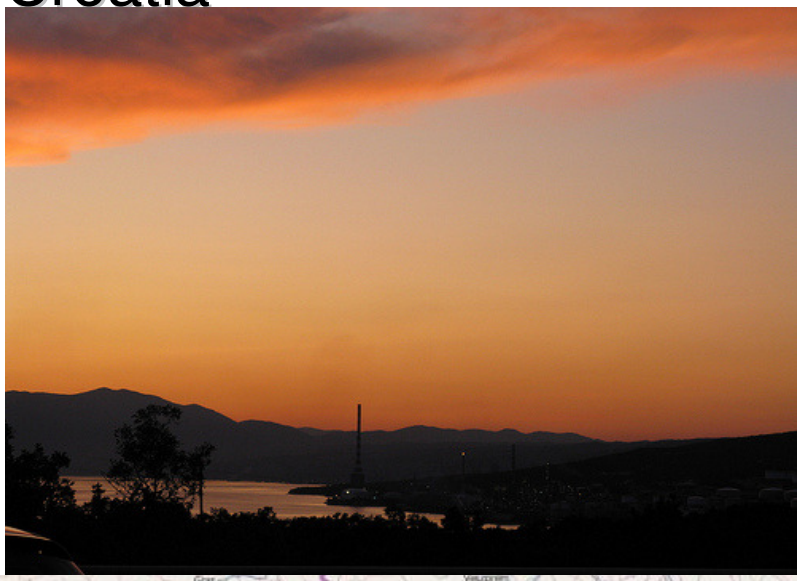
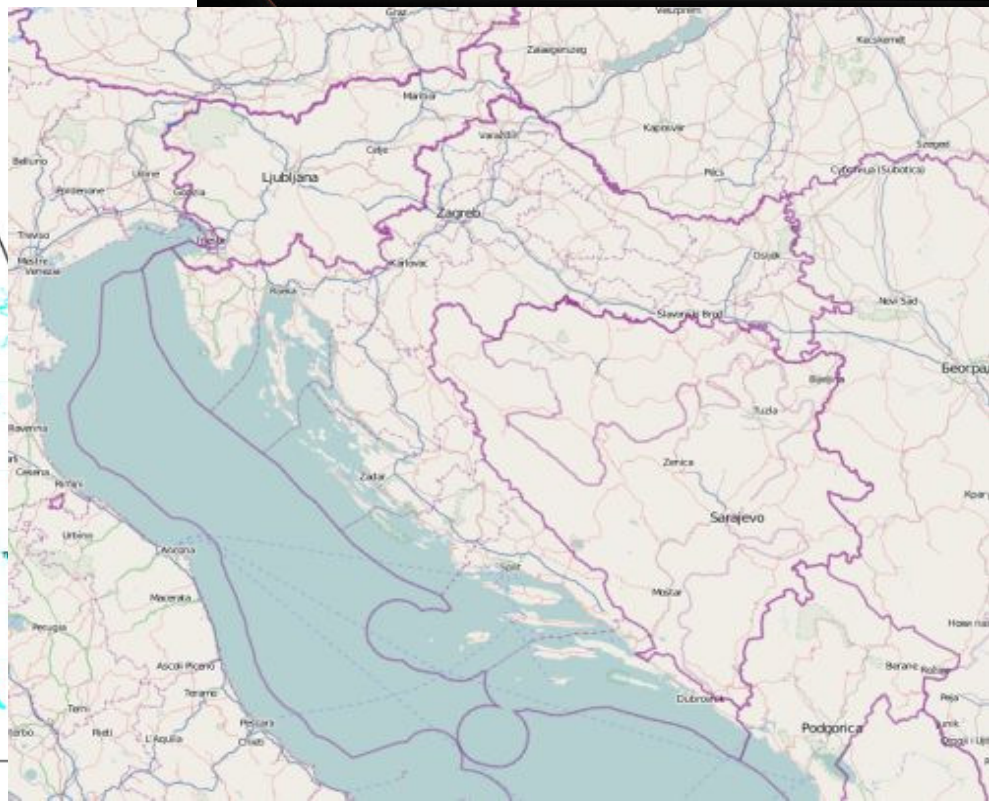
- Related research in Croatia
  - SW monitoring
  - Monitoring of ionosphere
  - Monitoring of troposphere
  - Monitoring SW effects on GNSS





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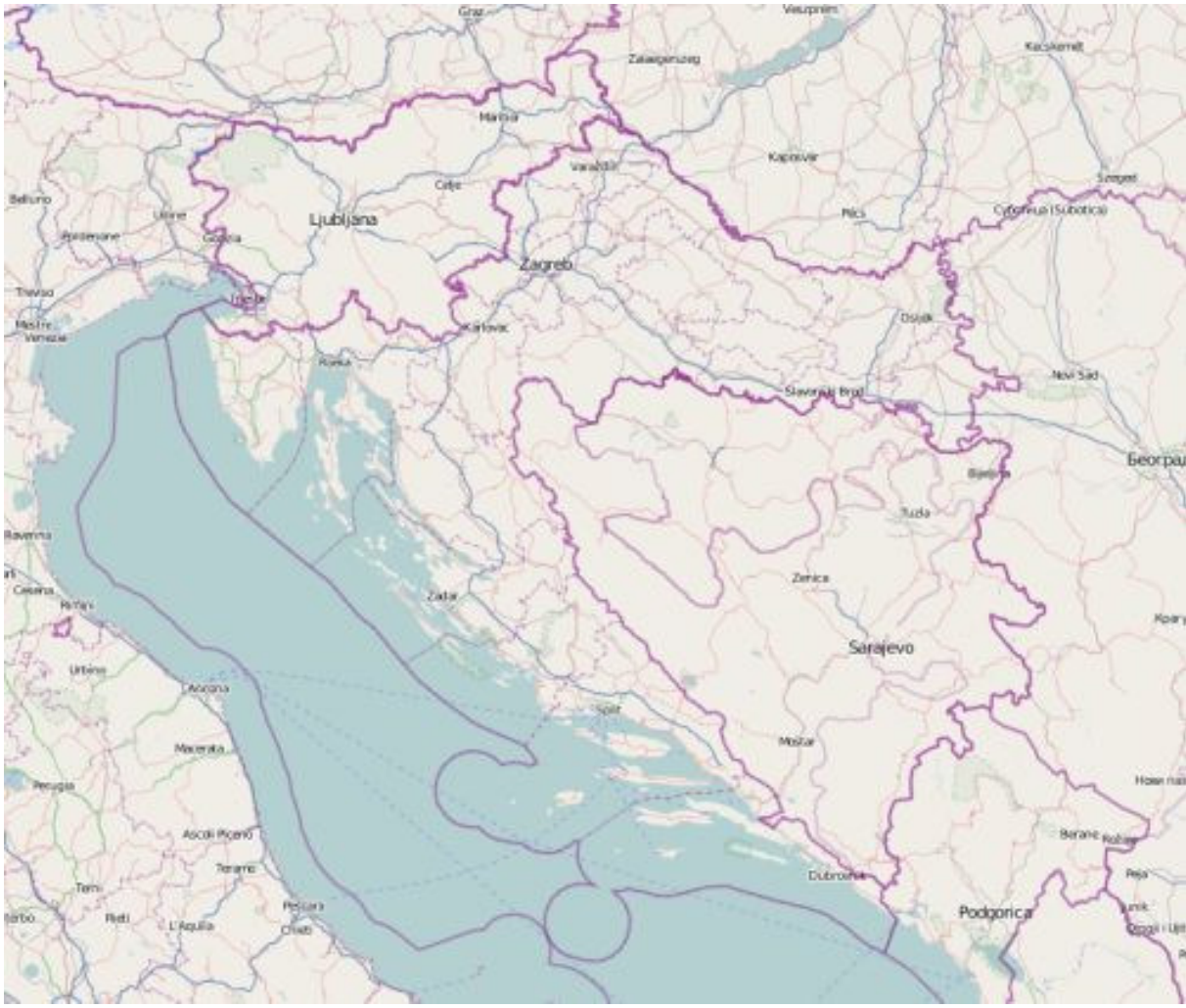
- Outcomes of GNSS-SW research in Croatia
  - Research projects
  - Data sources
  - Methodology



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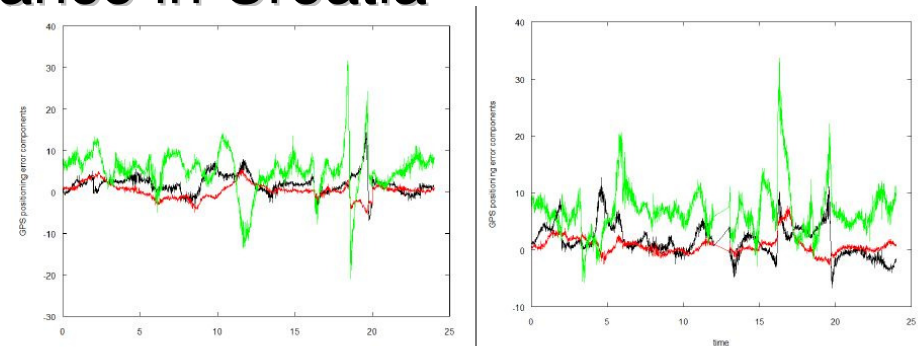
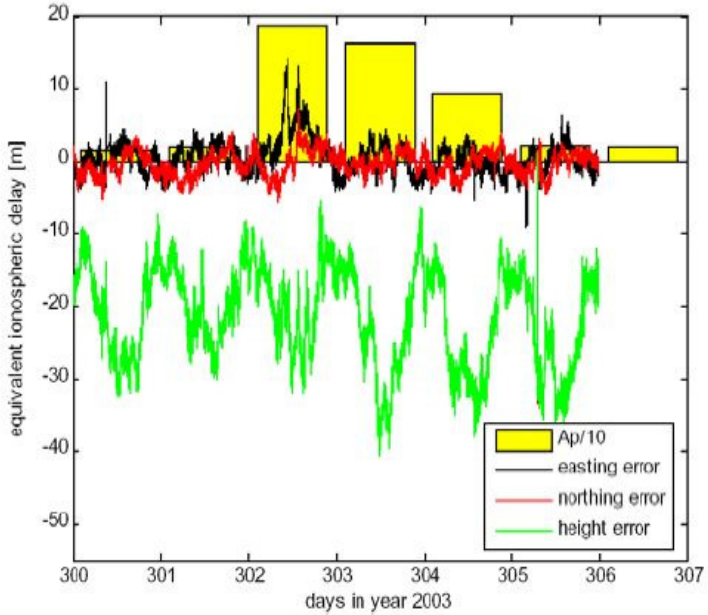
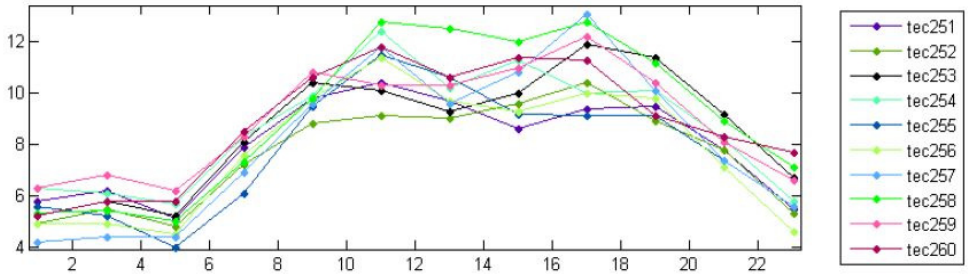
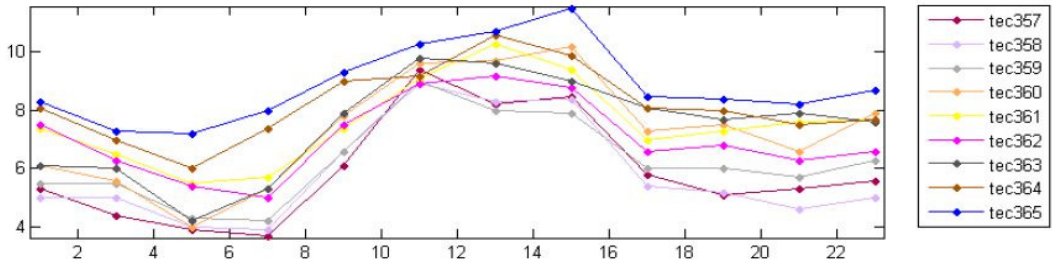
- Outcomes of GNSS-SW research in Croatia
  - Local GPS ionospheric delay patterns in quiet space weather
  - Local GNSS performance in severe space weather









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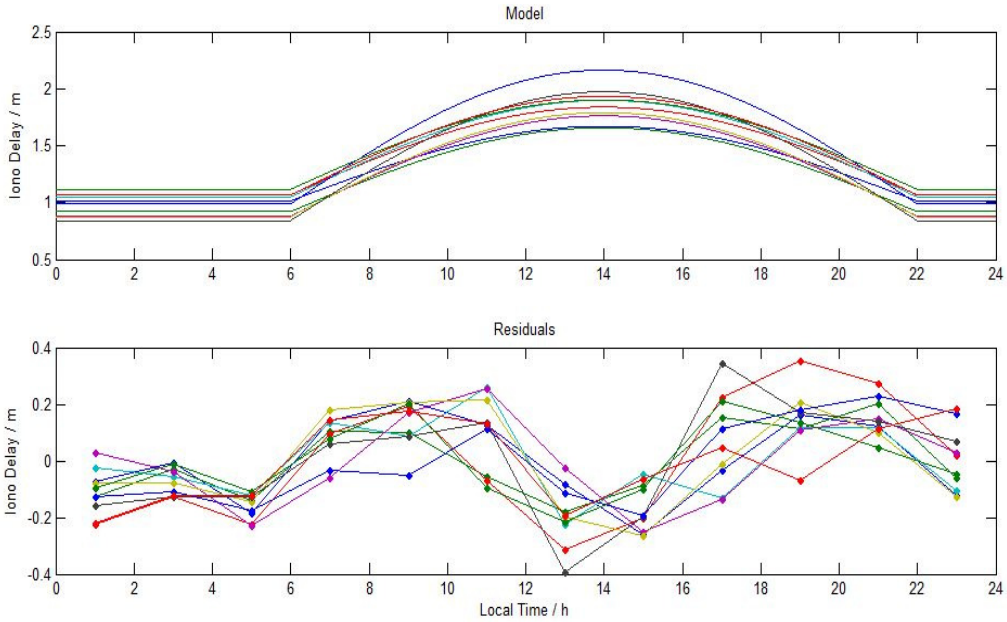
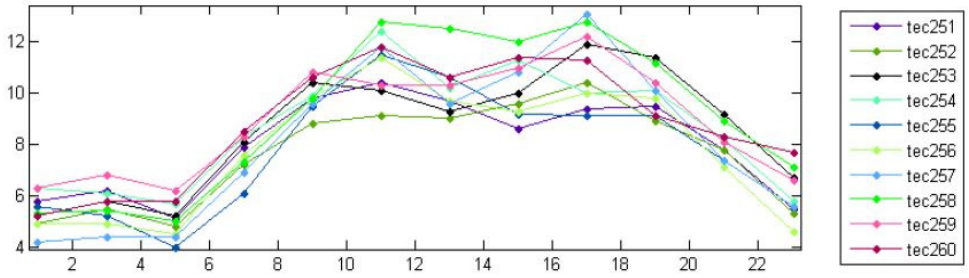
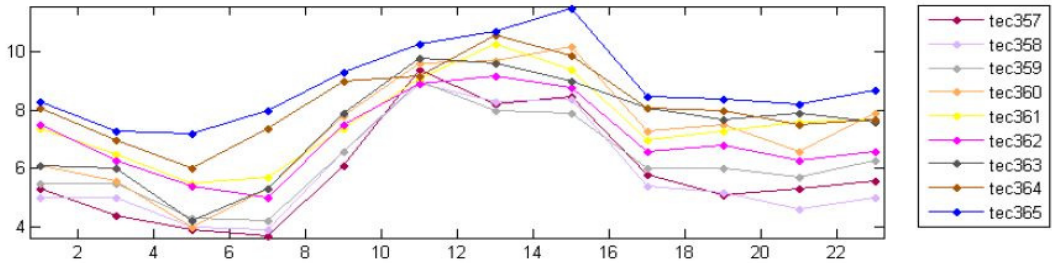
- Outcomes of GNSS-SW research in Croatia
  - Northern Adriatic GPS ionospheric correction model (Klobuchar-like)







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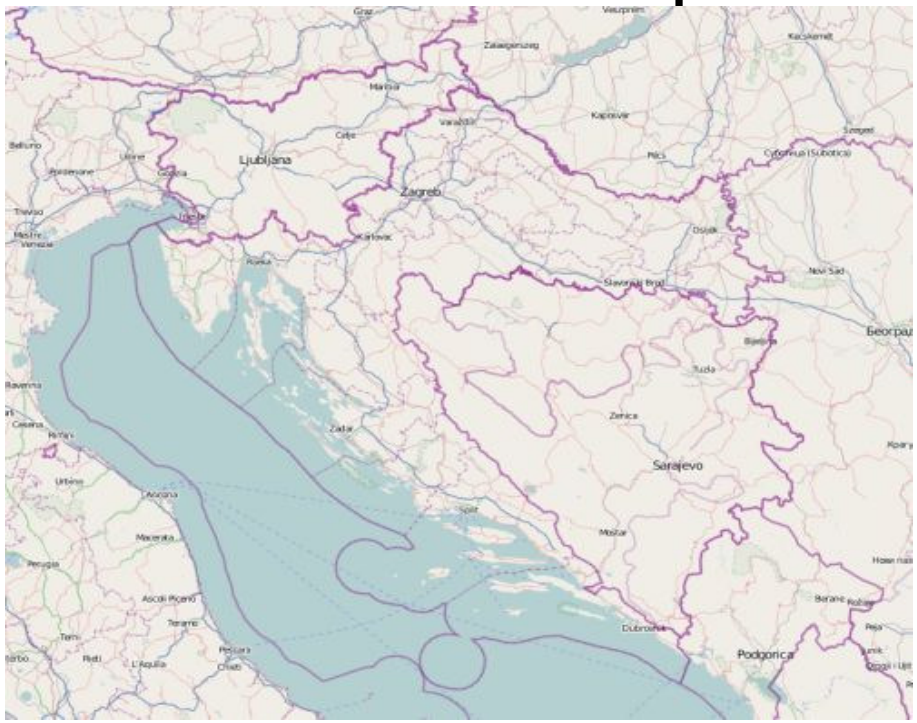
- Near-term extension of research scope
- Local monitoring of both space weather and GNSS performance
- International co-operation and data exchange



- Conclusion
  - Research aimed to:
    - identify the relationship between space weather and local ionospheric conditions, and GNSS performance,
    - understand local patterns of geomagnetic and ionospheric conditions and the sources of GNSS error patterns
    - develop local GNSS ionospheric model


THANK YOU FOR YOUR ATTENTION!
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