AVIDOS AVIATION DOSIMETRY

SEIBERSDORF LABORATORIES
FREQUENTLY ASKED SOLUTIONS

Member of esa SSA Space Radiation Expert Service Centre

AVIDOS 2.0 – Aviation Dosimetry Service at ESA's Space Weather Portal

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[2] International Foundation High Altitude Research Stations Jungfraujoch and Gornergrat, Bern, Switzerland

[3] Graz University of Technology, Austria

Space Weather Week, Boulder (USA)

13 – 17 April, 2015

AVIDOS
AVIATION DOSIMETRY

SEIBERSDORF
LABORATORIES

- Standard testing laboratory for ionising radiation
- ISO 9001 certified management system
- Accredited test house 312 for ionising radiation according EN/ISO/IEC 17025
- Accredited test house 312 for assessment of radiation exposure at flight altitudes according EN/ISO/IEC 17025
  - On-Board measurements
  - Modelling
  - Comparison of Models

Akkreditierung Austria

bmwfj
Bundesministerium für Wirtschaft, Familie und Jugend

Bestätigung der Akkreditierung

Akkreditierung Austria bestätigt, dass die Konformitätsbewertungsstelle

Seibersdorf Labor GmbH

EMV
Ionisierende Strahlung und Strahlenschutz
Dopinganalytik
Laser, LED & Lampen-Sicherheit
Chemische Analytik

2444 Seibersdorf

Identifikationsnummer: 312

Datum der Erstakkreditierung: 01.10.2009

als Prüfstelle akkreditiert ist und die Anforderungen der ÖVE/ÖNORM EN ISO/IEC 17025:2007 erfüllt.

Der detaillierte Umfang der Akkreditierung ist dem letztgültigen Bescheid zu entnehmen.

Die Konformitätsbewertungsstelle ist in der Liste der akkreditierten Stellen unter www.bmwfj.gv.at/akkreditierung veröffentlicht.

Wien, am 13.02.2013

Dipl.-Ing. Dr. Norman Brunner

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Acknowledgements

- SOLARDOS – research contract with Austrian Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), http://www.bmlfuw.gv.at/
- SL Development – Aviation Dosimetry, http://www.seibersdorf-laboratories.at/
- AVIDOS SN-VI – ESA contract No AO/1-7234/12/D/MRP (Task1); financial support by Austrian Bundesministerium für Verkehr, Innovation und Technologie (BMVIT, http://www.bmvit.gv.at/) and The Austrian Research Promotion Agency (FFG, https://www.ffg.at/).
- OULU Neutron Monitor Station, http://cosmicrays.oulu.fi/
- NMDB – Neutron Monitor Database, http://www.nmdb.eu/
- ANEMOS service, http://swe.ssa.esa.int/web/guest/anemos-federated

State of the Art - AVIDOS 1.6

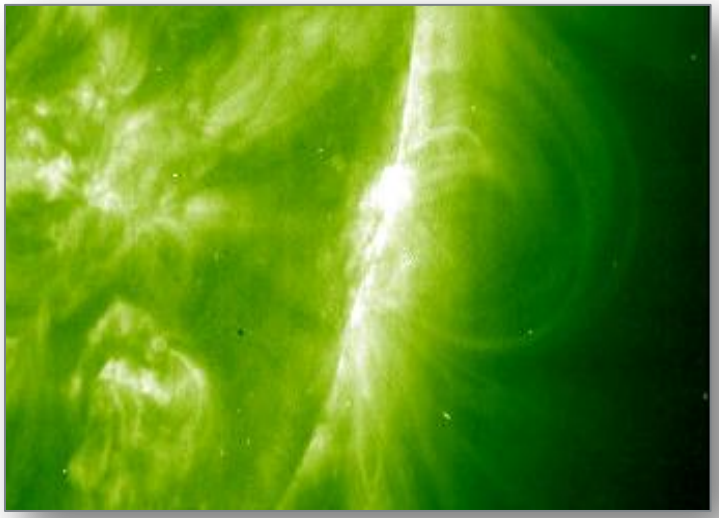
- Online informational and educational software
- Assessment of radiation dose exposure at flight altitudes caused by galactic cosmic radiation
- User: public, aircrews and experts

Screenshot taken from
http://swe.ssa.esa.int/web/guest/avidos-federated

Current development of the Solar Energetic Particle Module - AVIDOS 2.0

Objective: Estimation of minimum and maximum isotropic radiation exposure

- solar energetic particles
- flight altitudes
- real time
- based on one European neutron monitor (Oulu) and literature
- triggered by ANEMOS[1] alerts



[1]ANEMOS - Expert Service Centre at ESA SSA Web portal for Ground Level Enhancement (GLE) event alert http://swe.ssa.esa.int/web/guest/anemos-federated

AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

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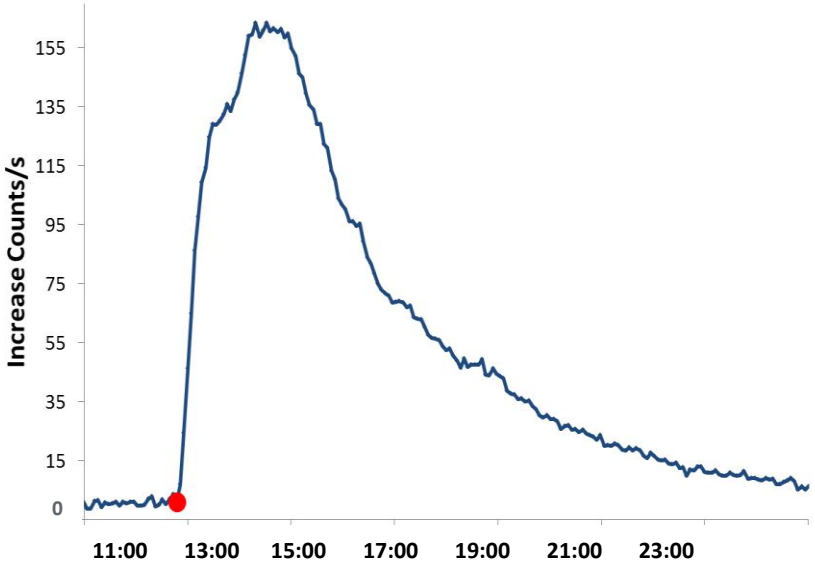

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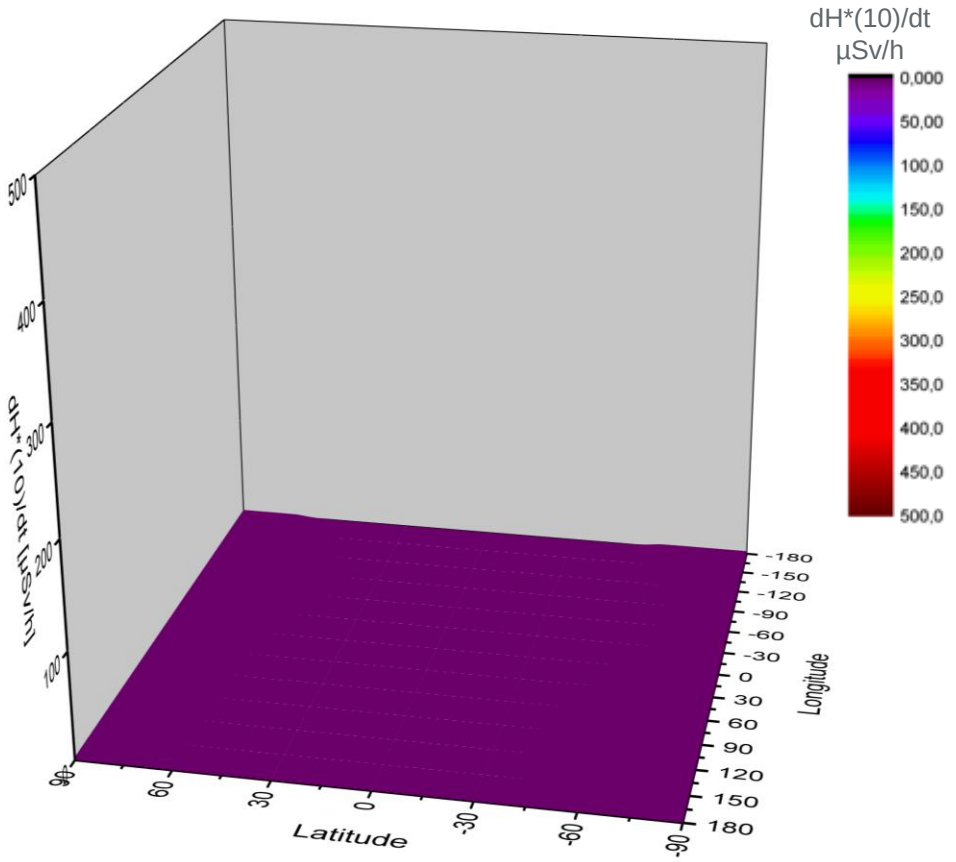

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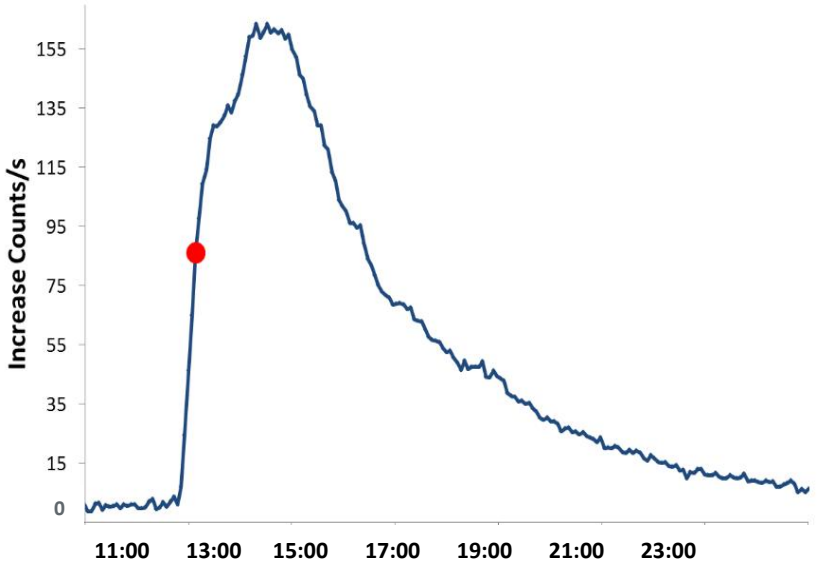

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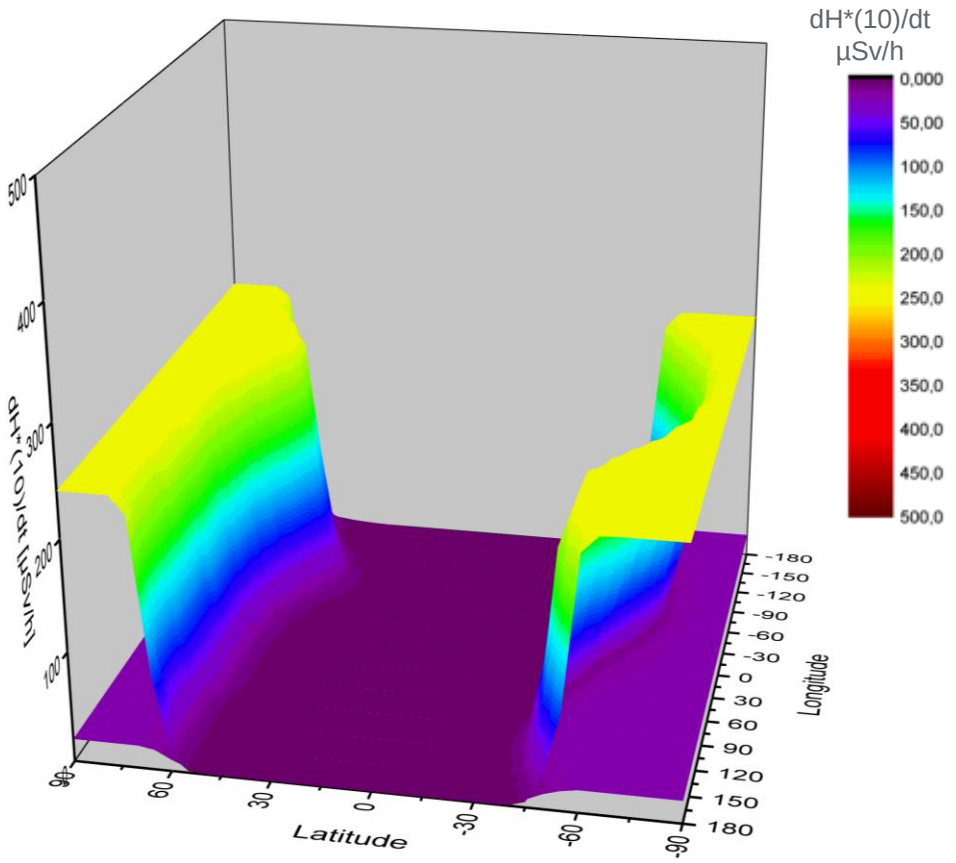

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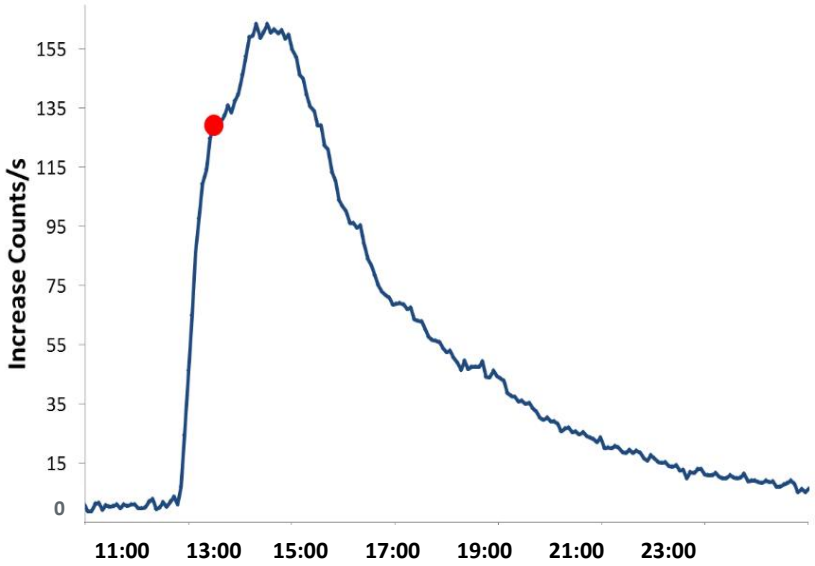

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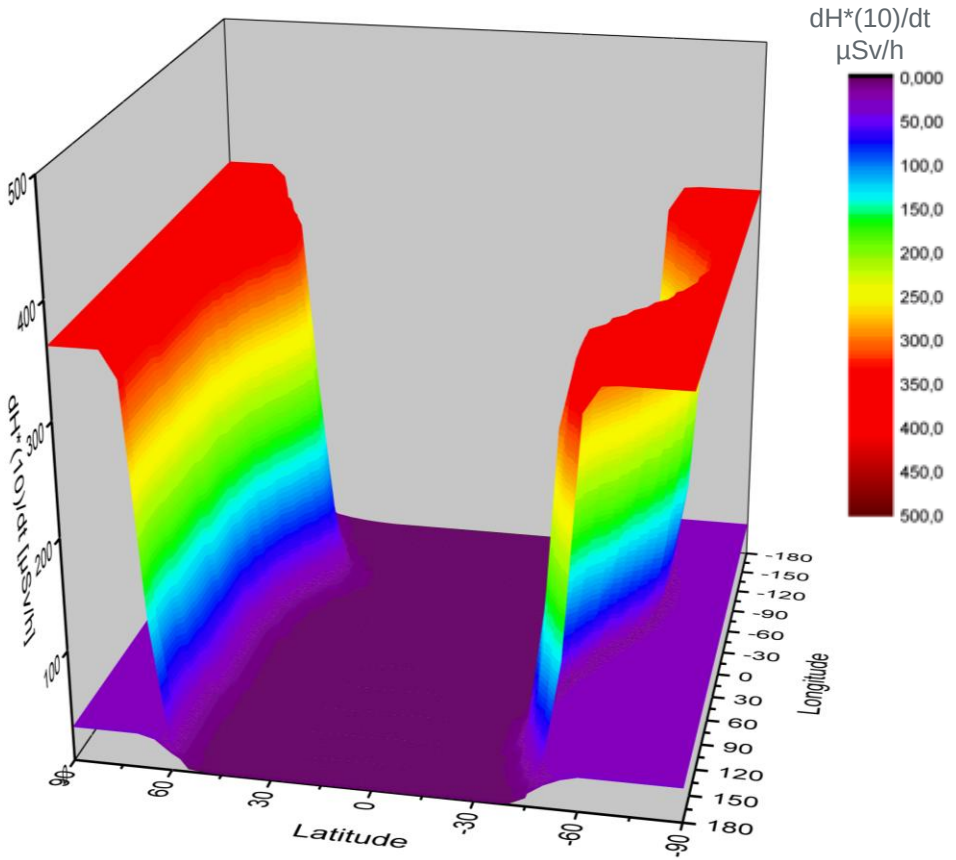

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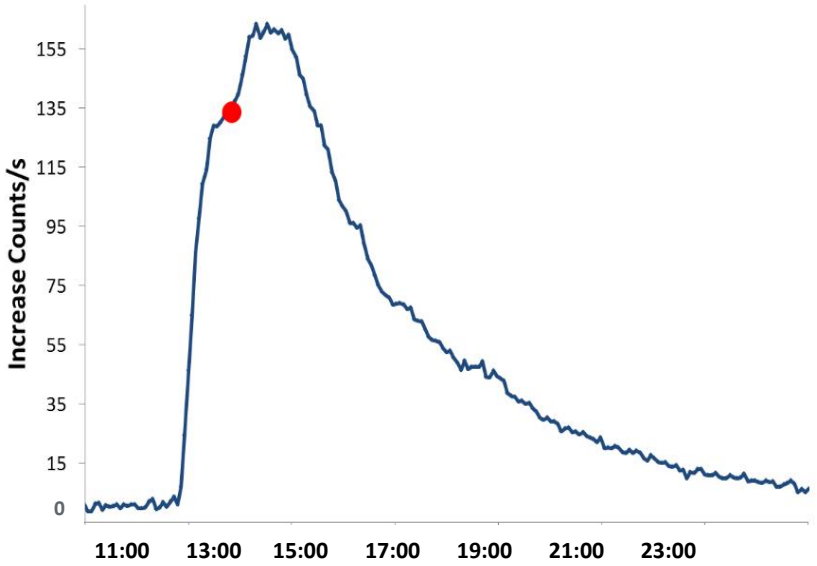

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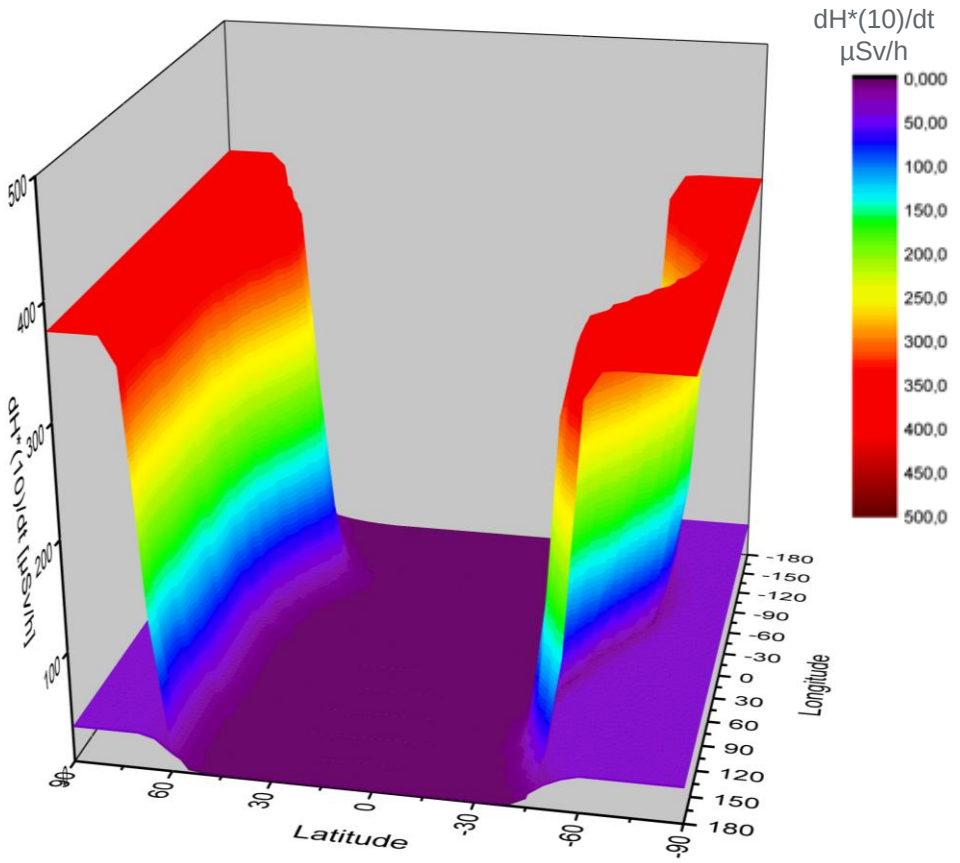

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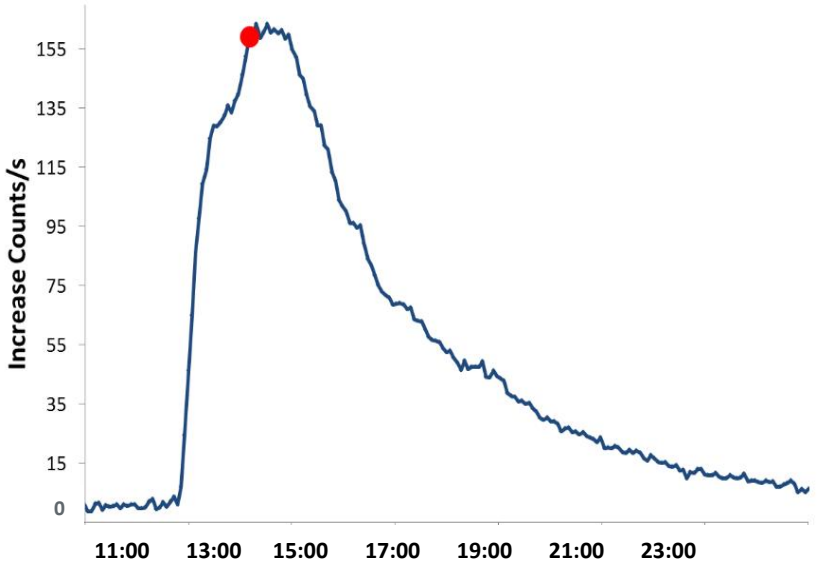

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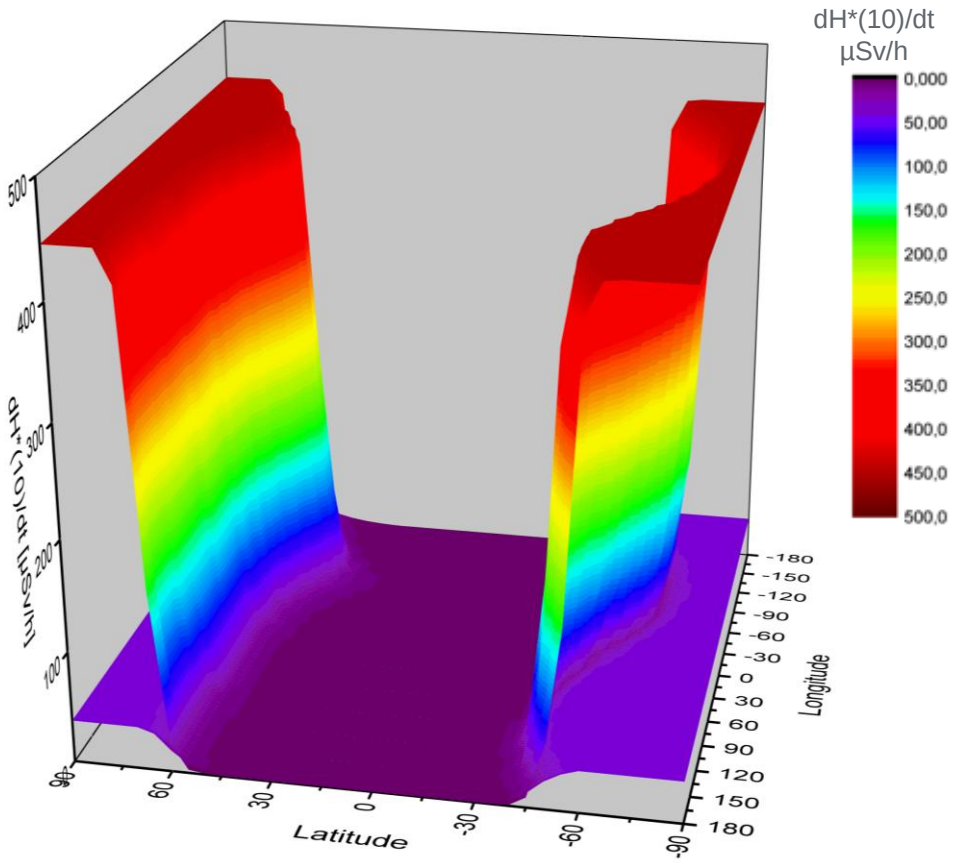

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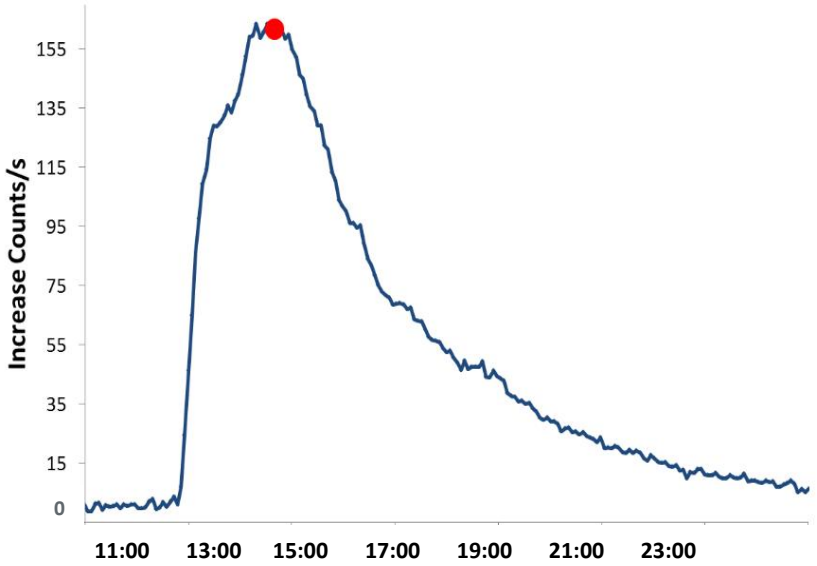

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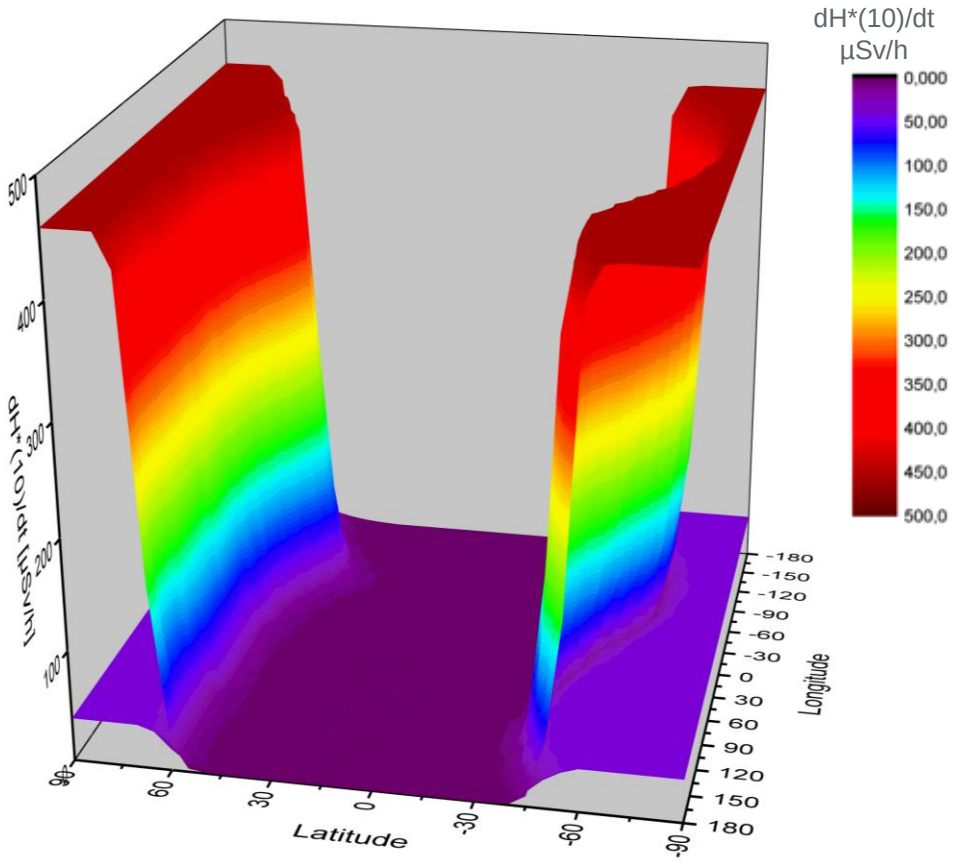

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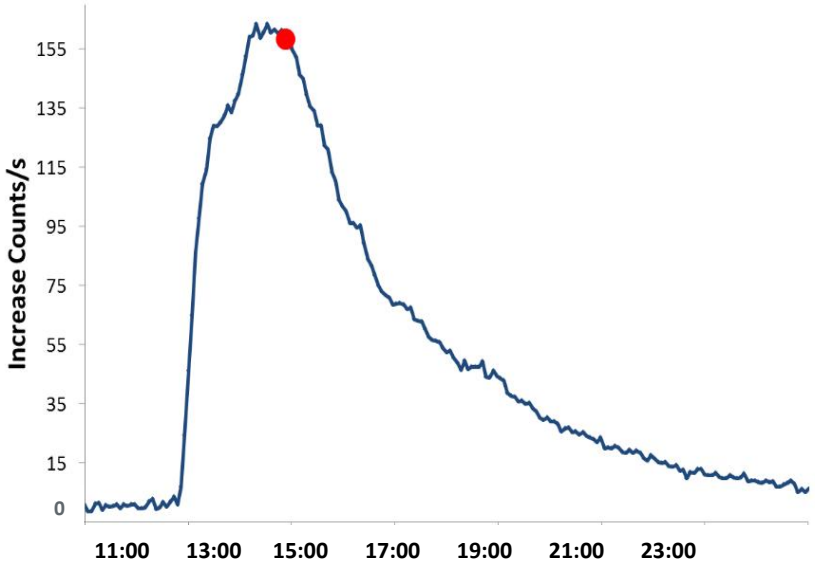

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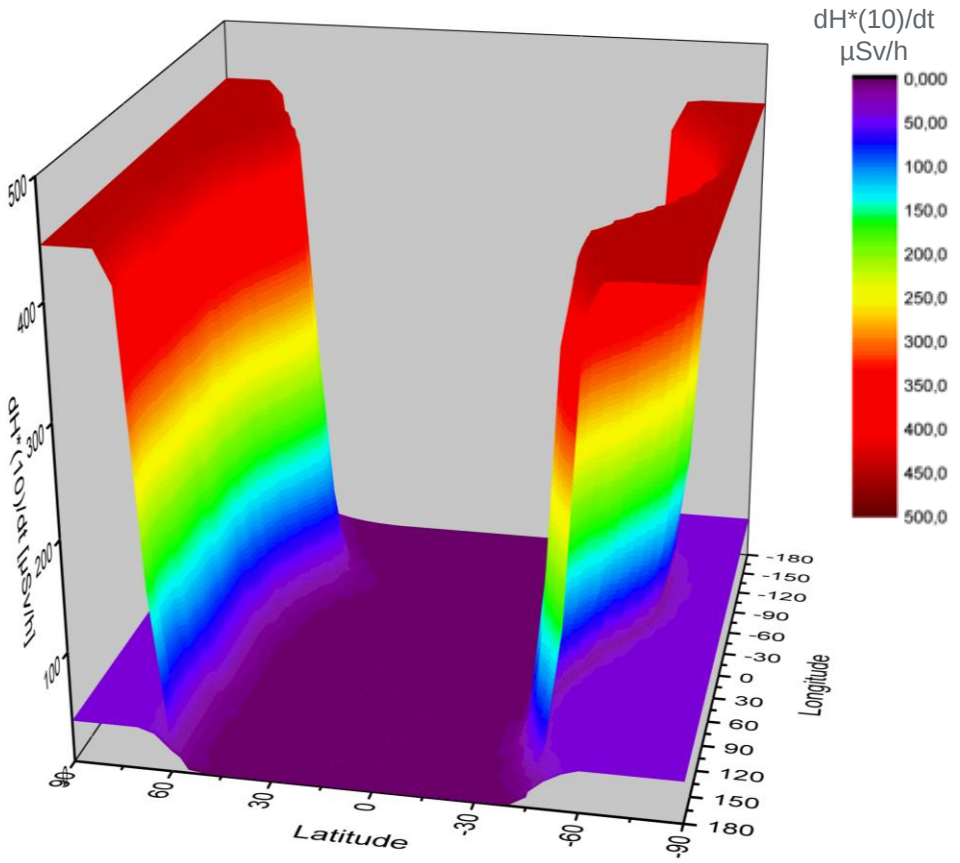

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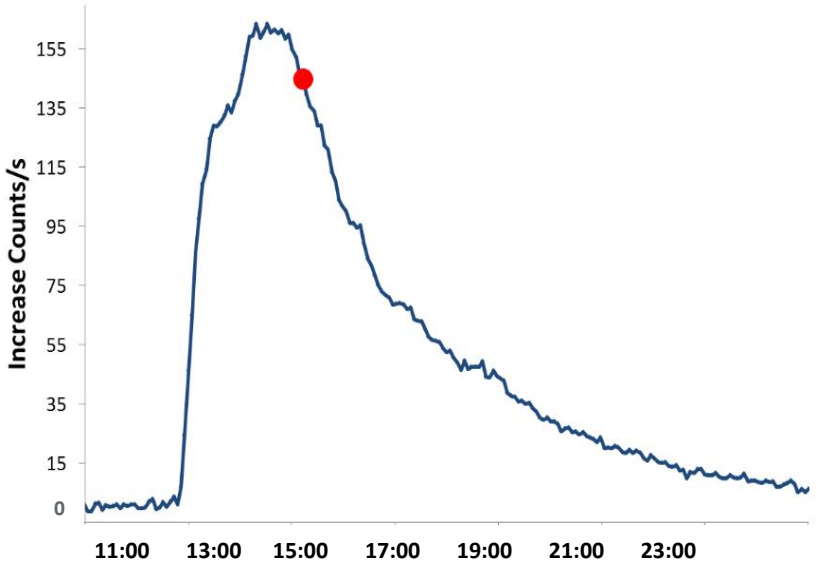

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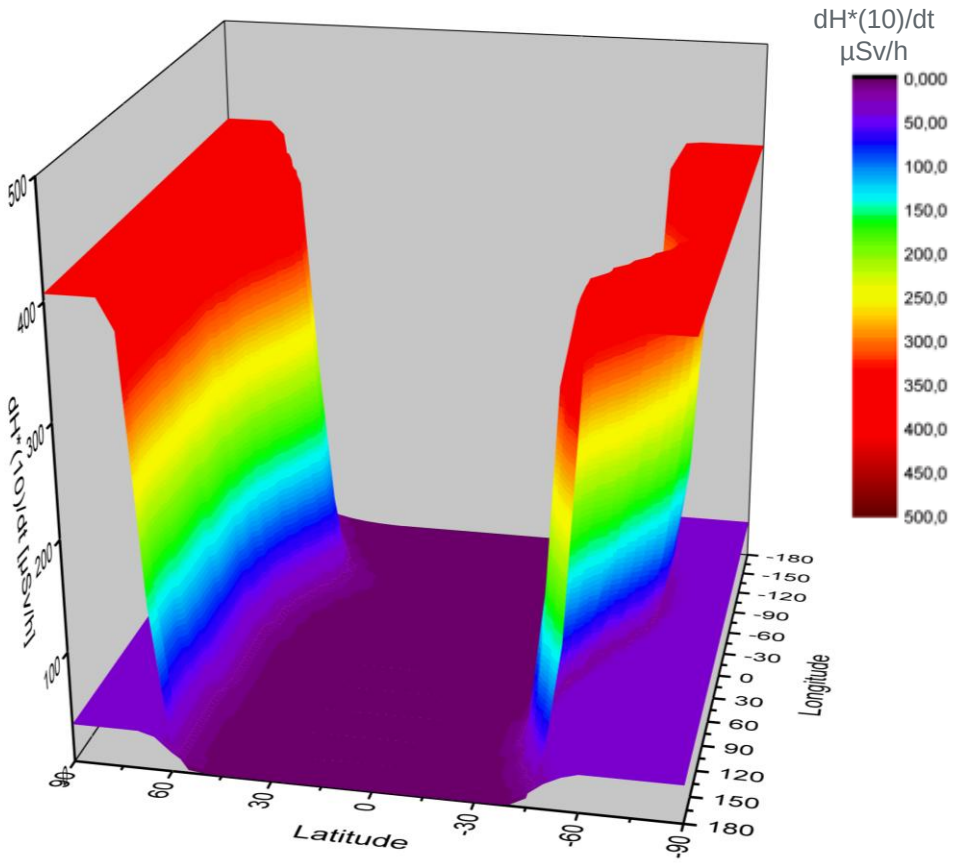

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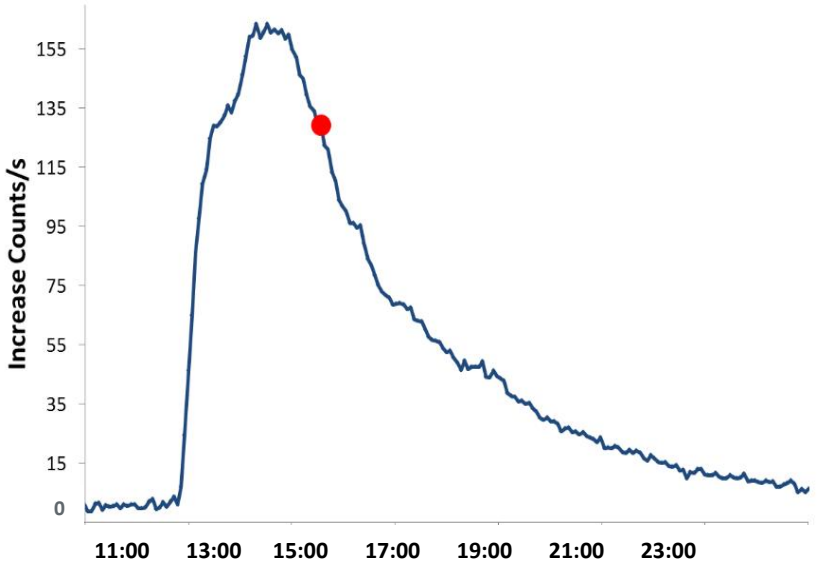

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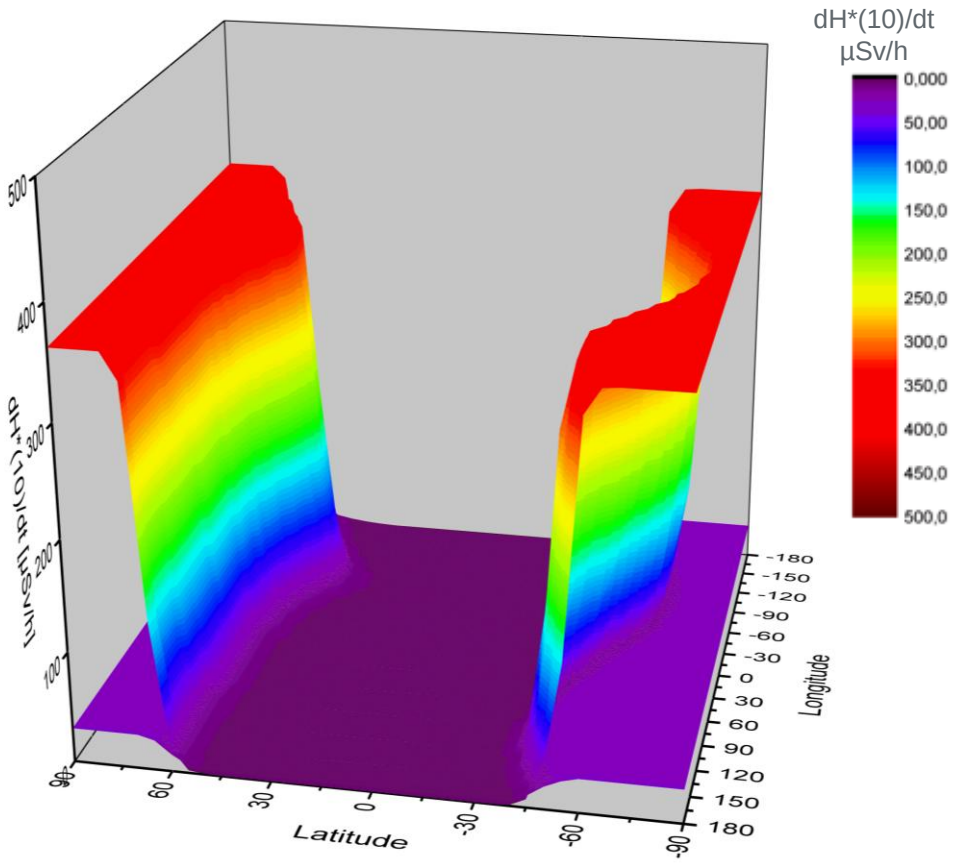

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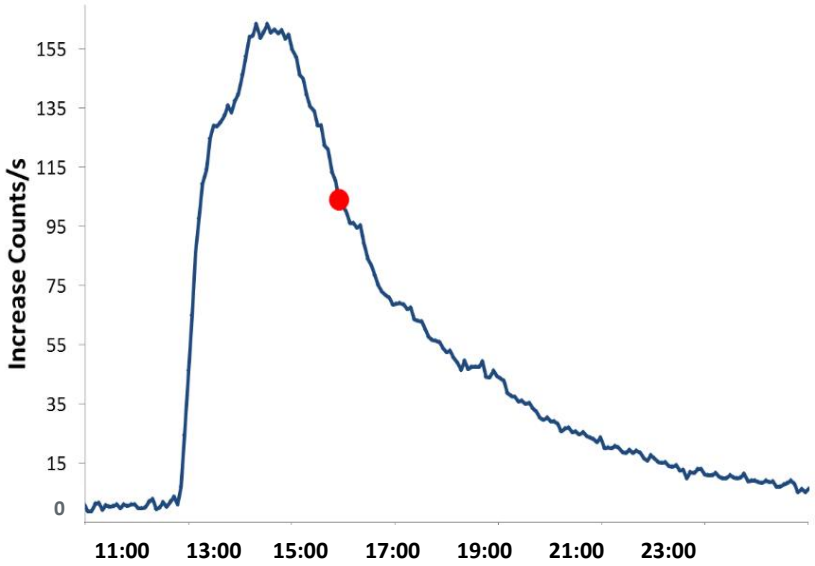

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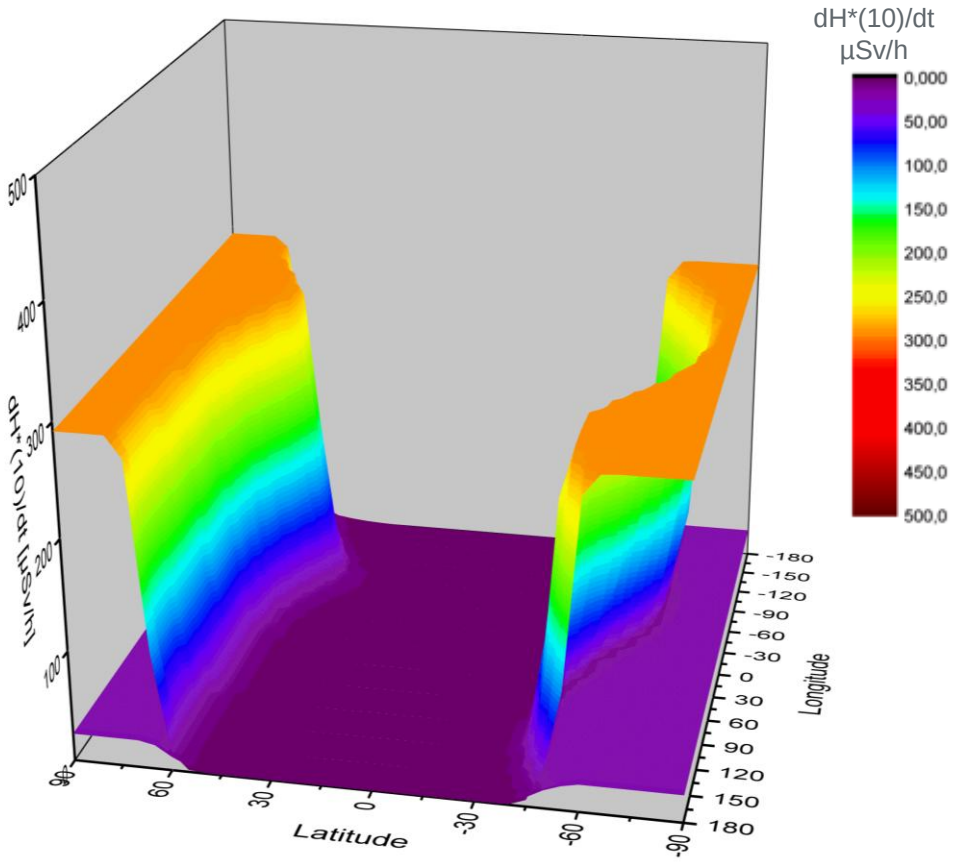

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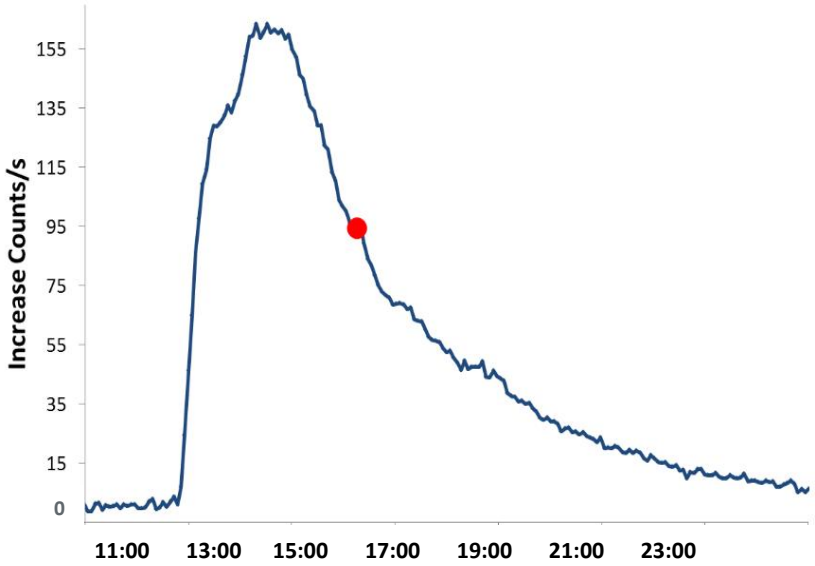

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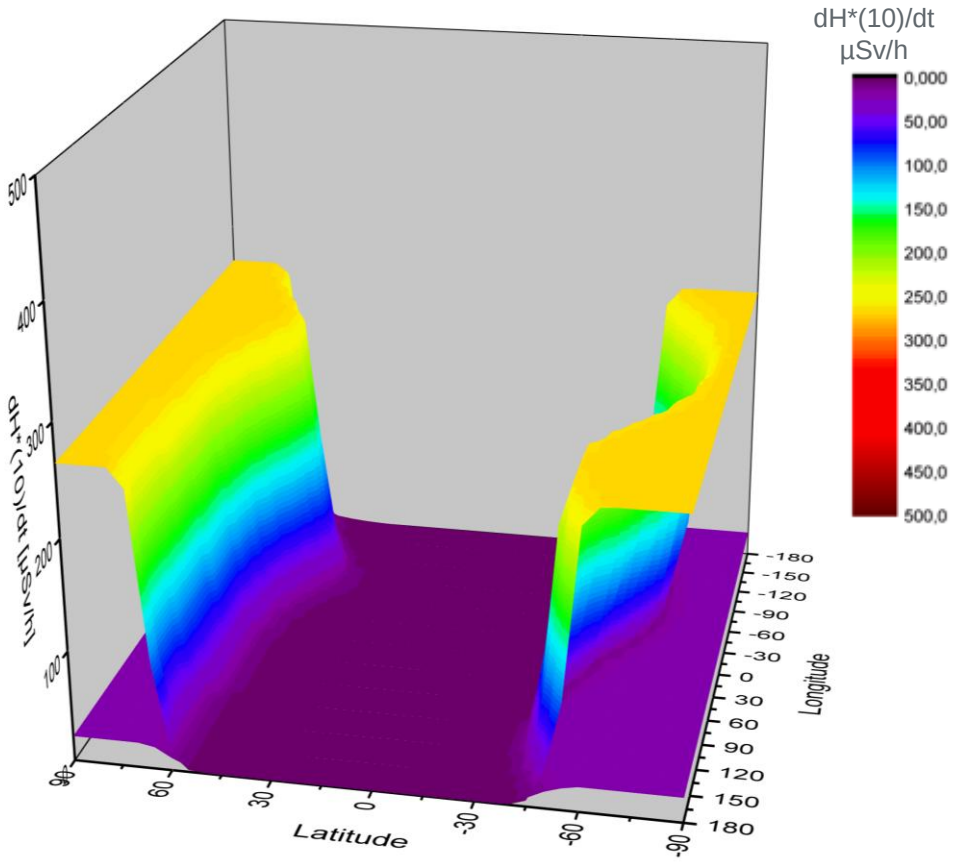

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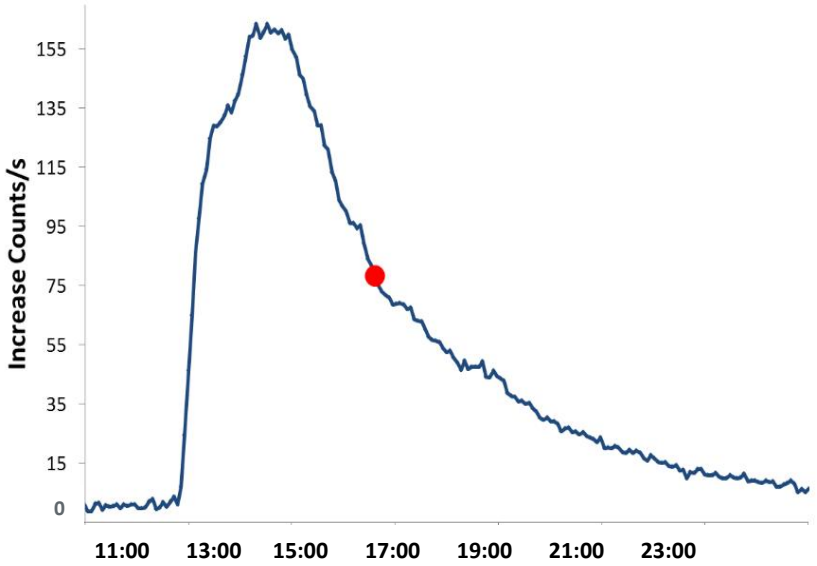

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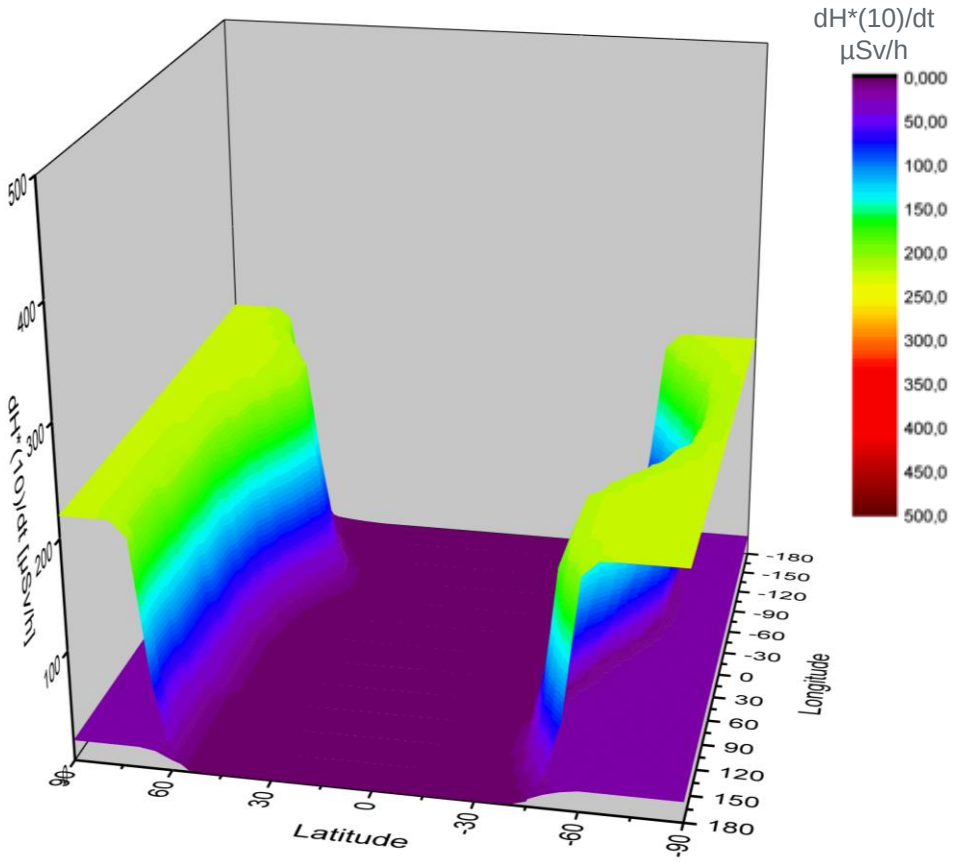

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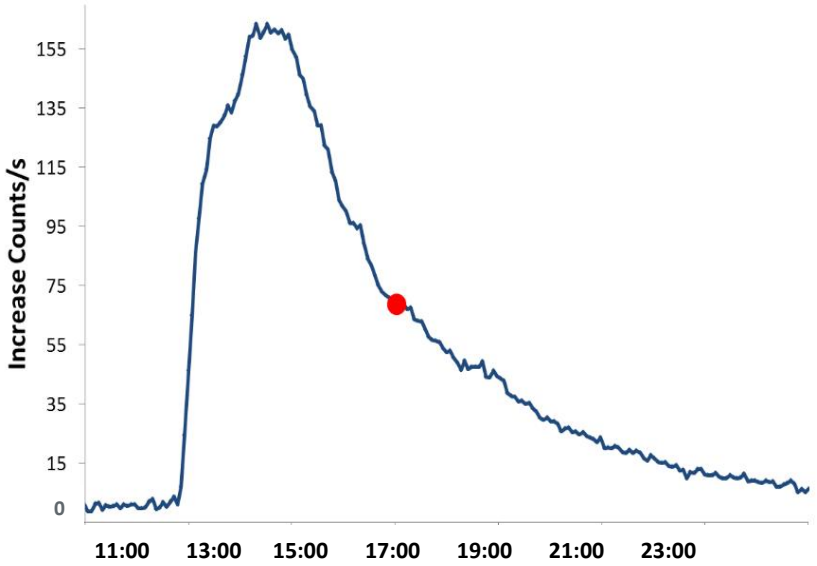

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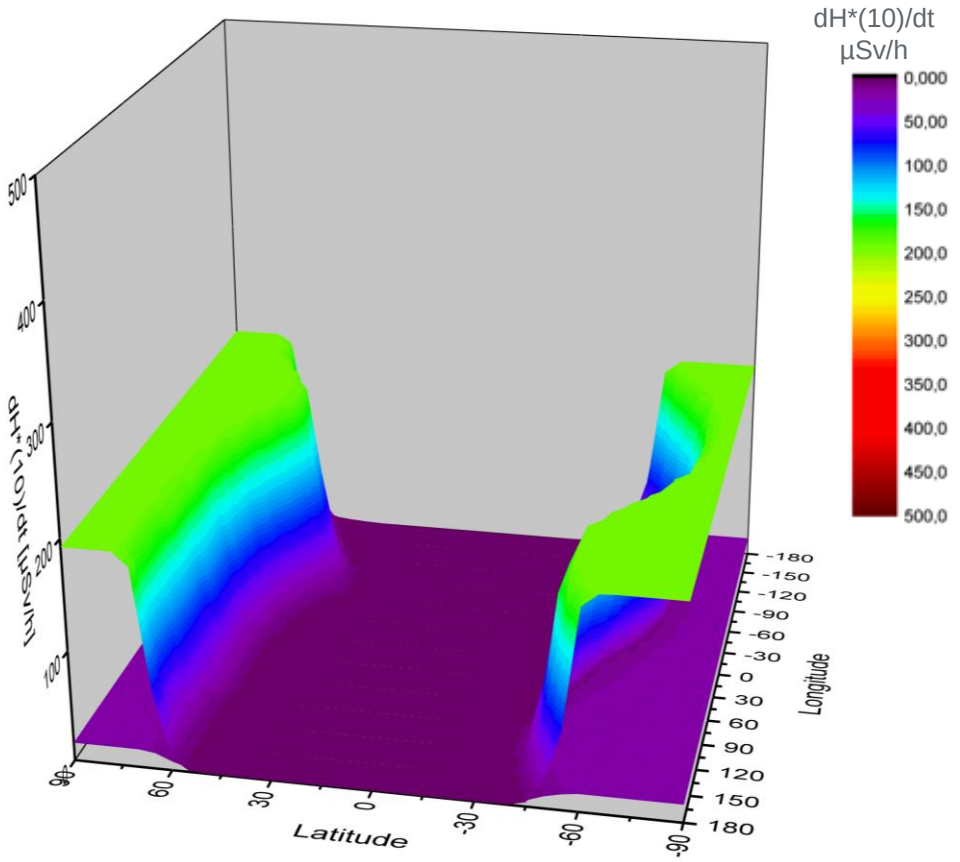

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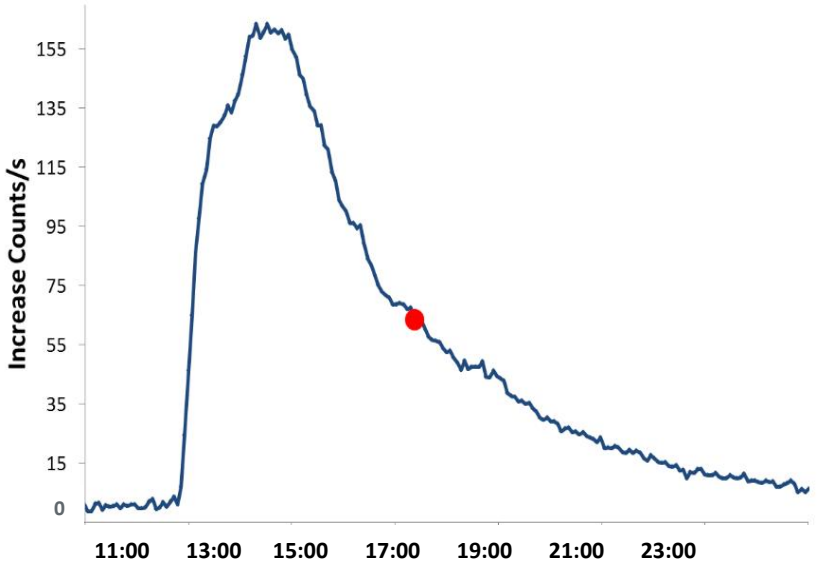

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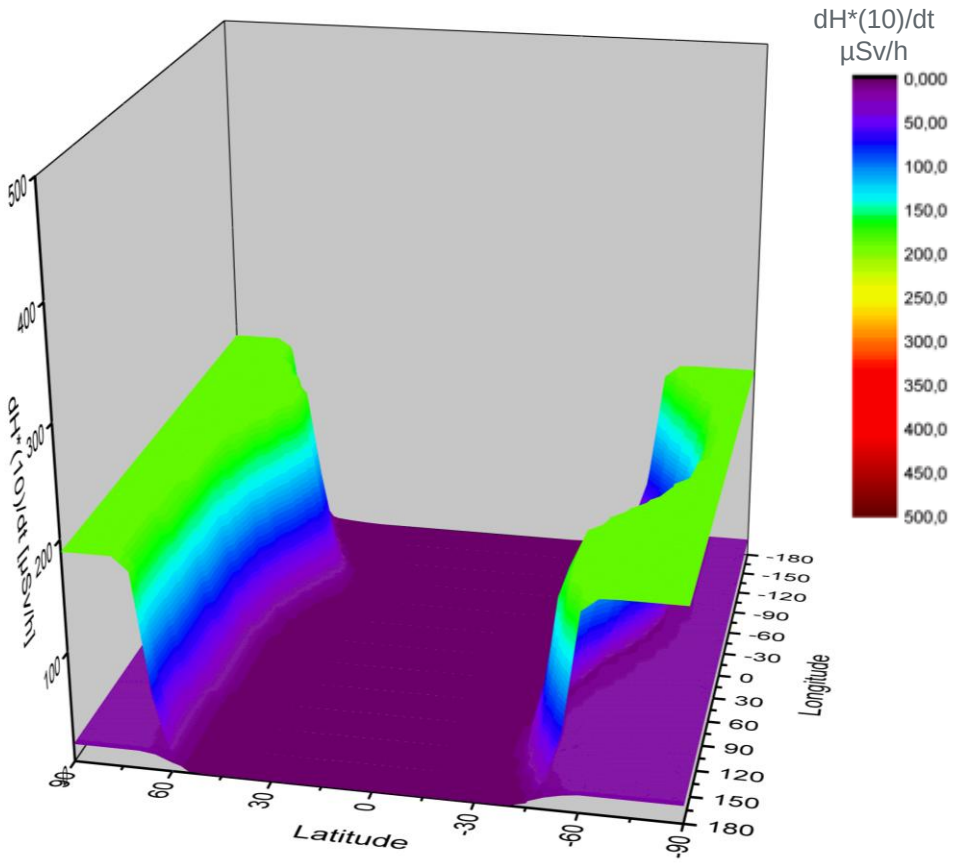

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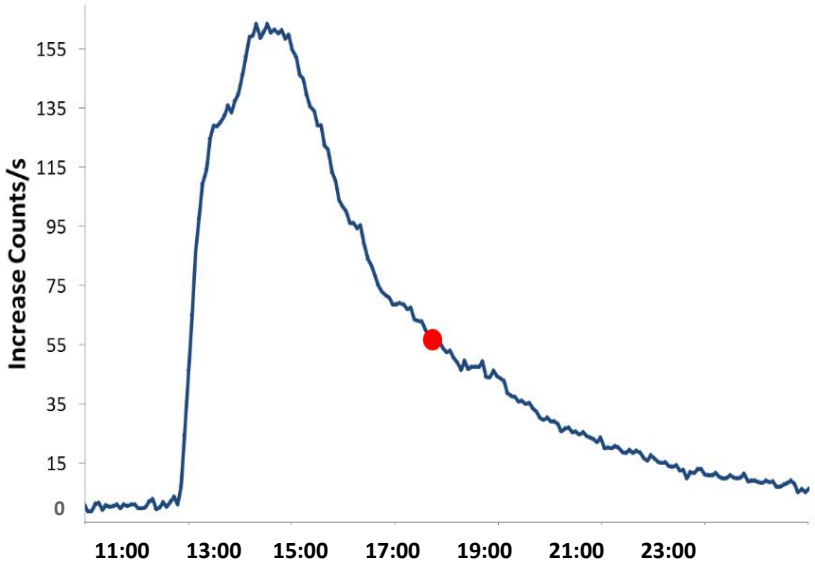

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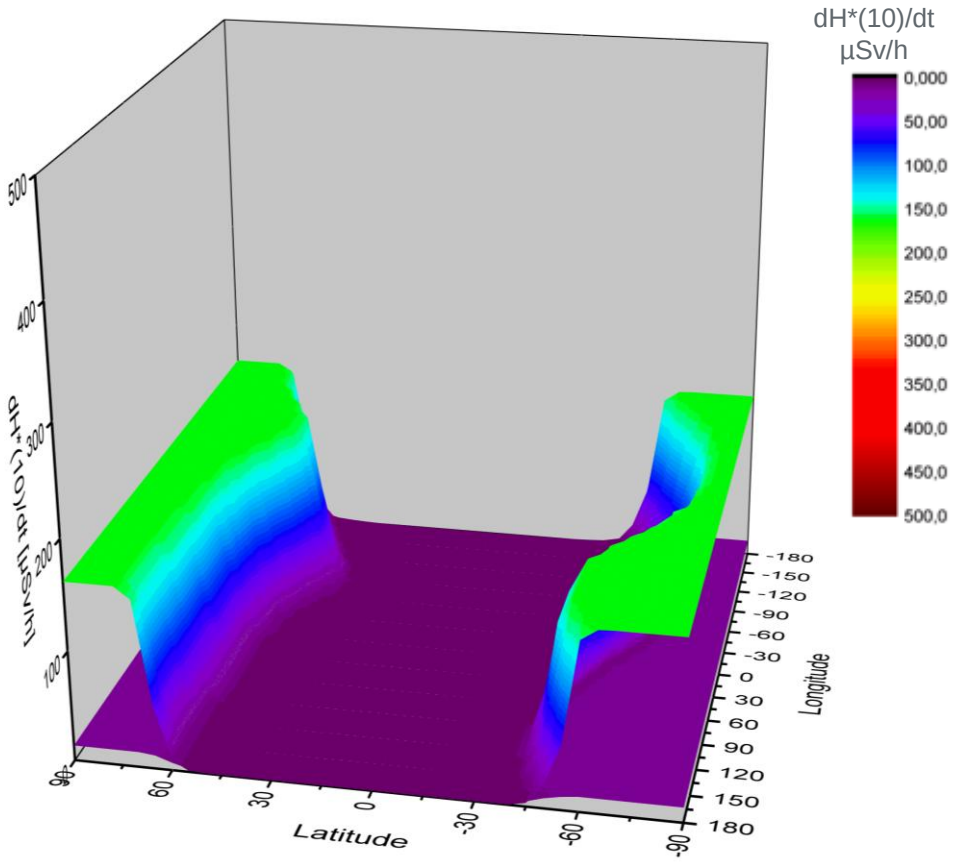

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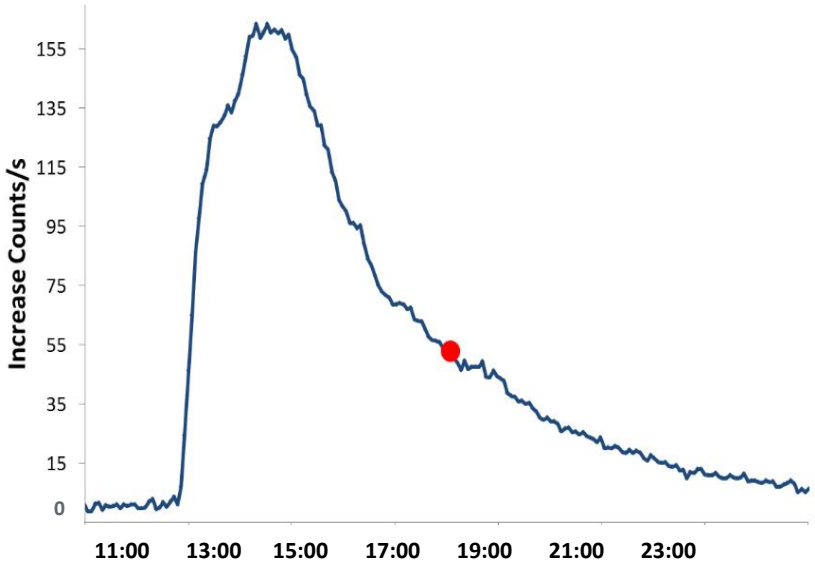

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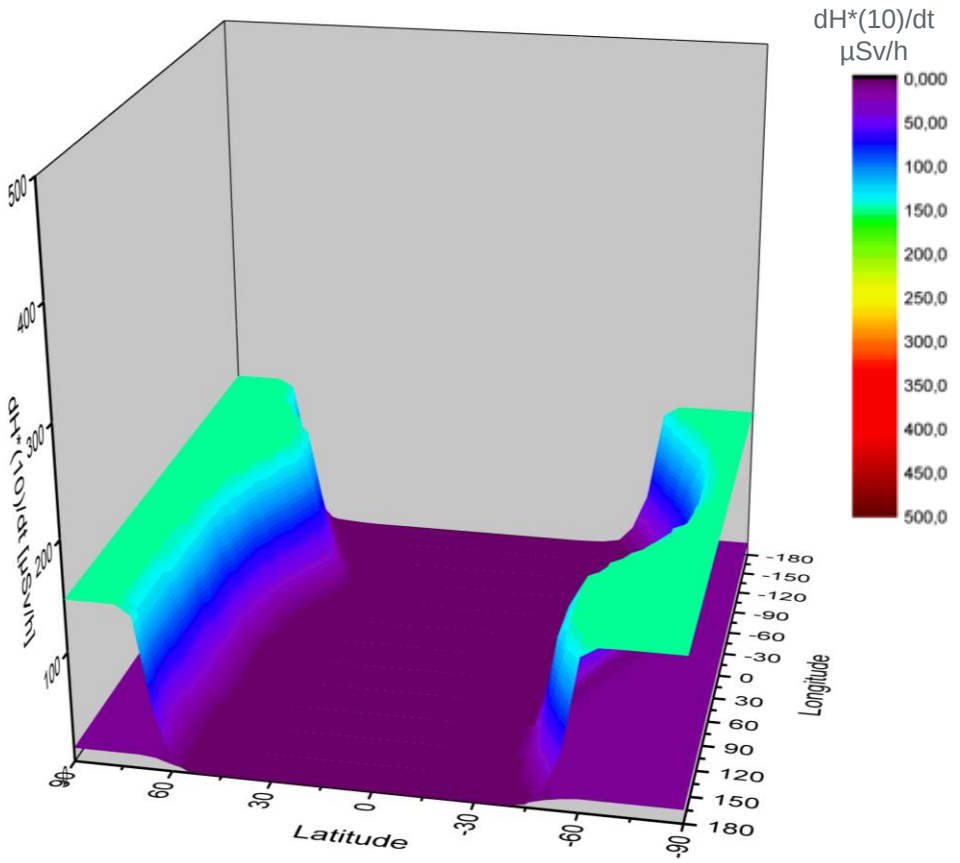

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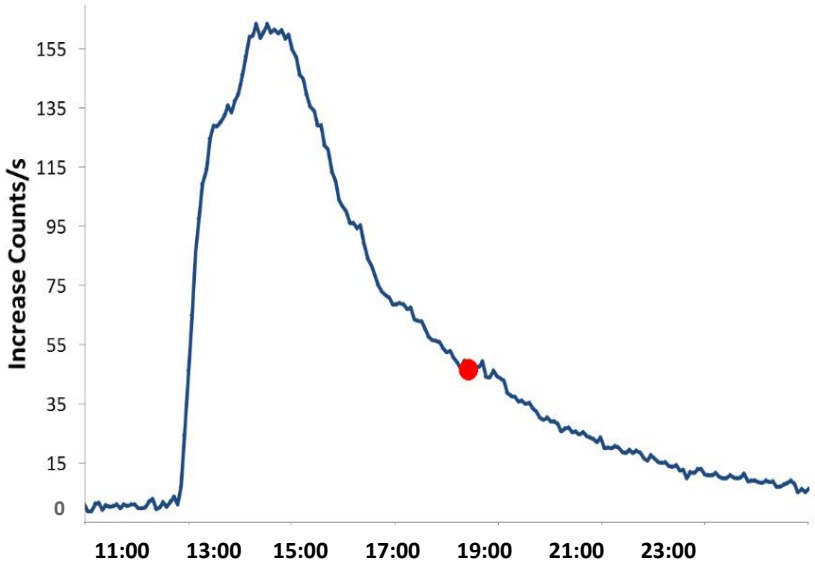

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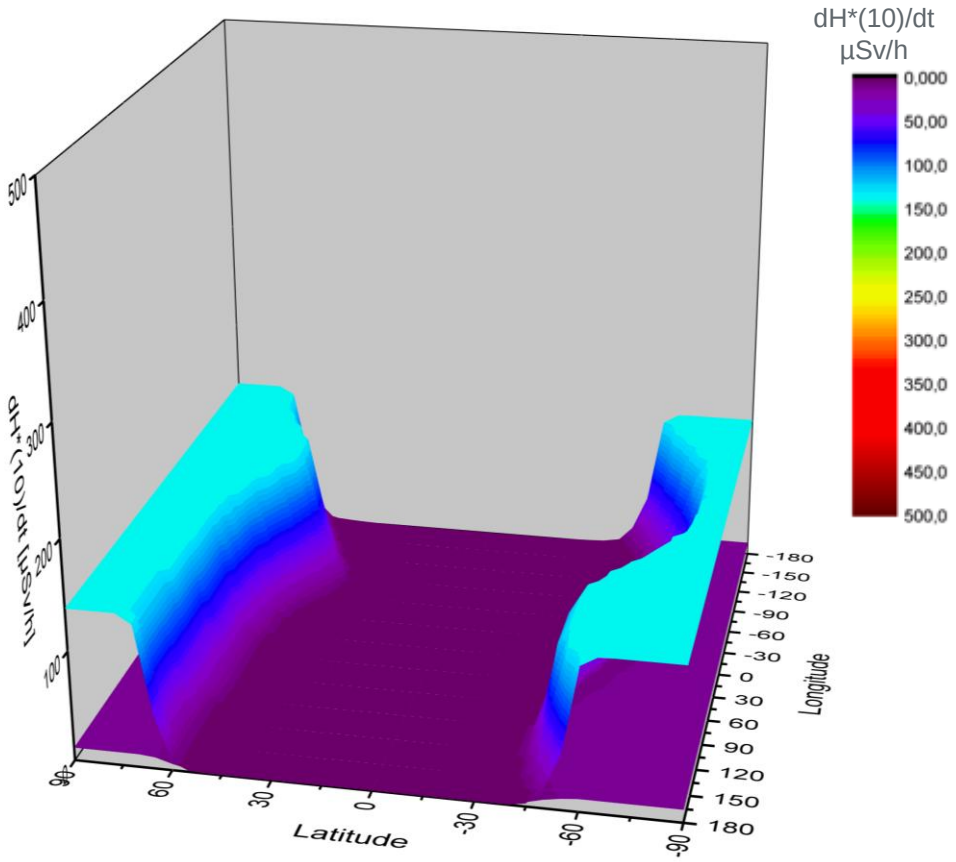

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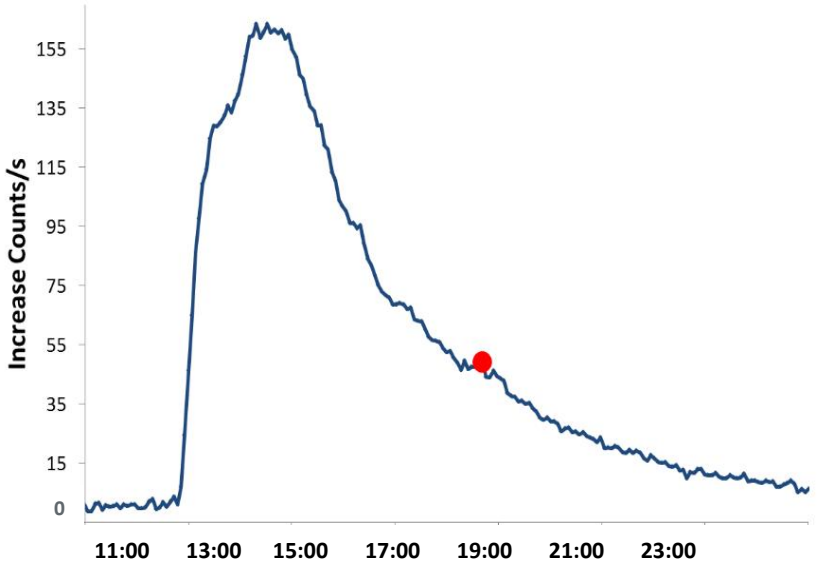

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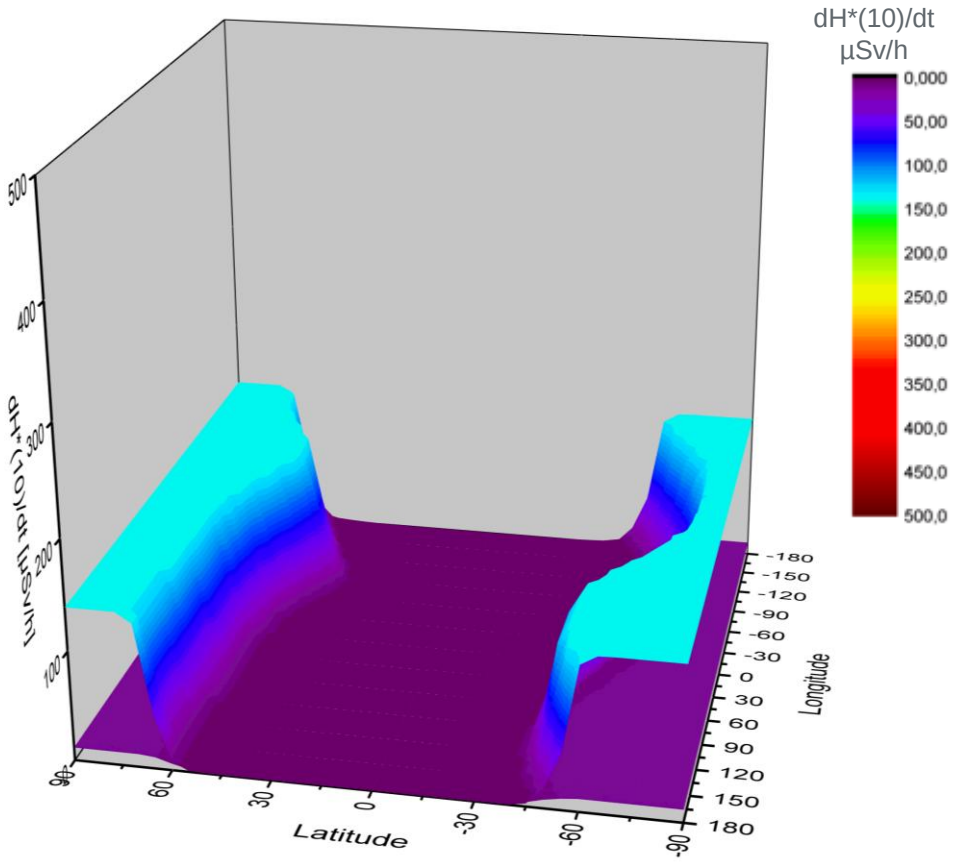

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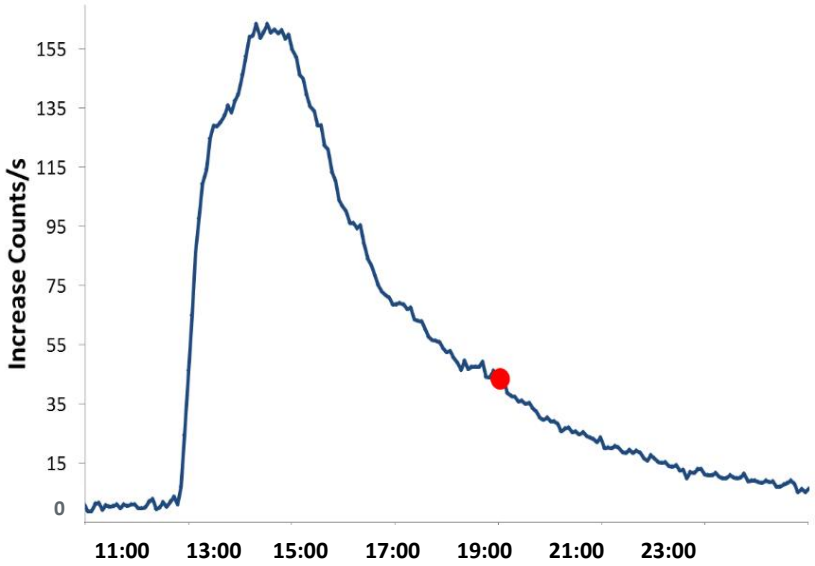

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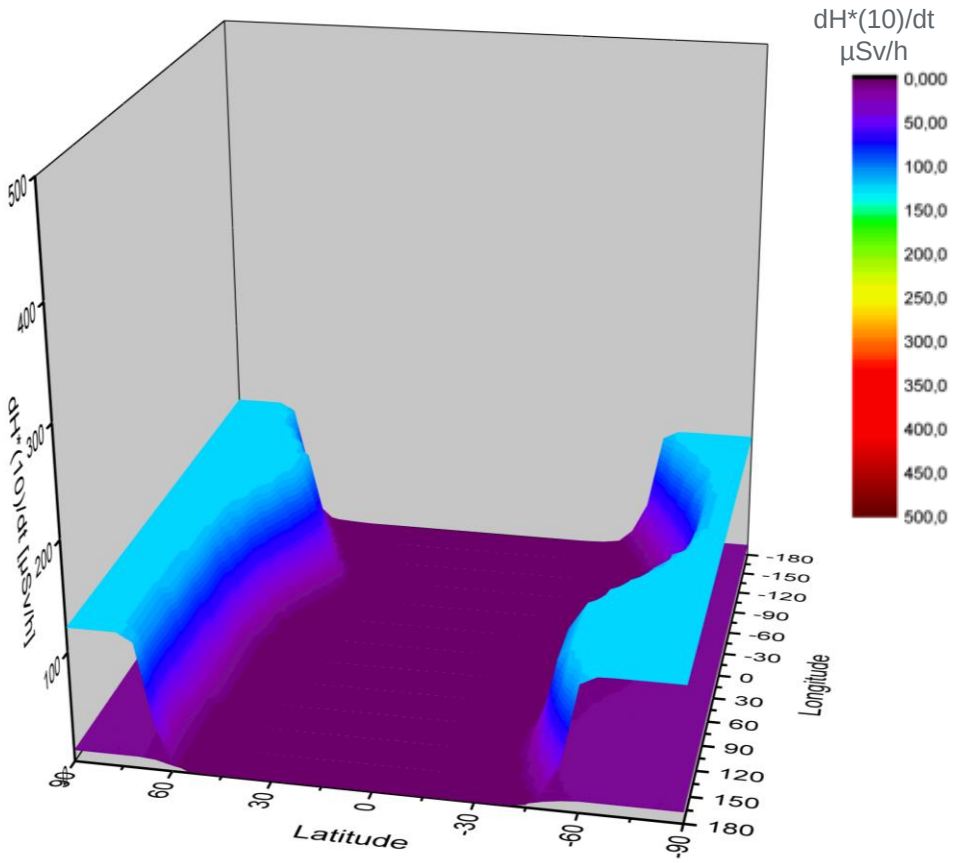

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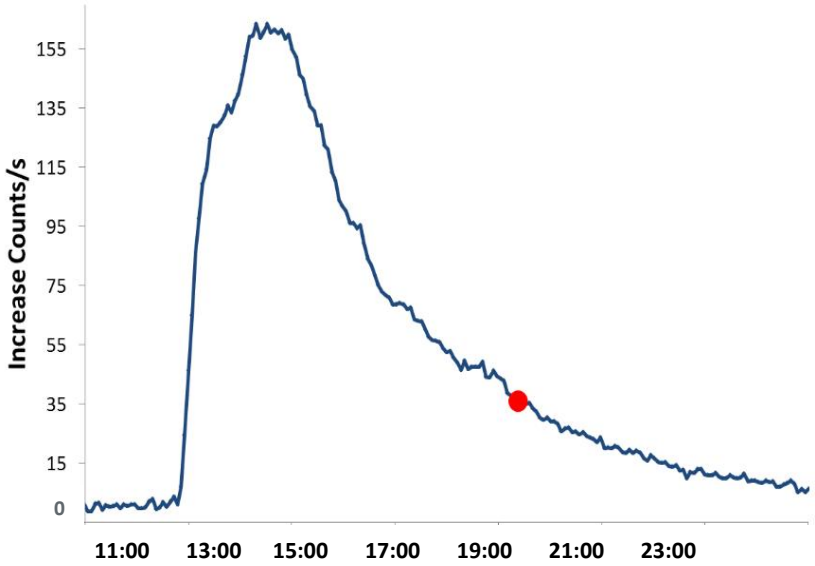

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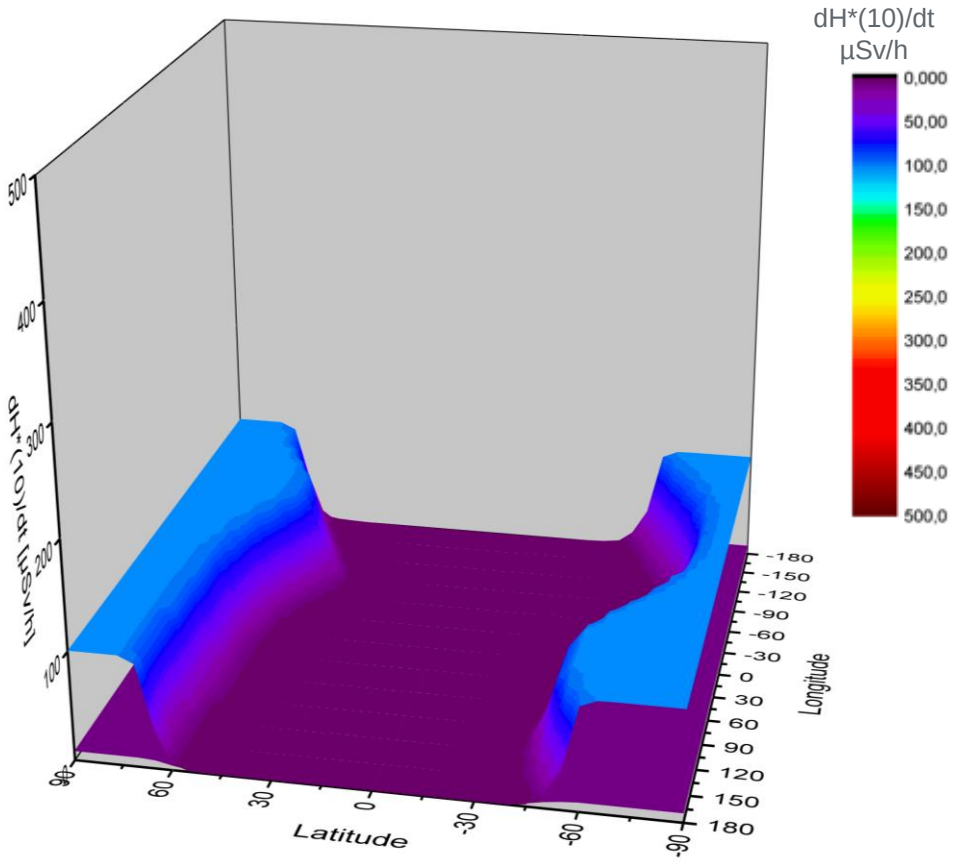

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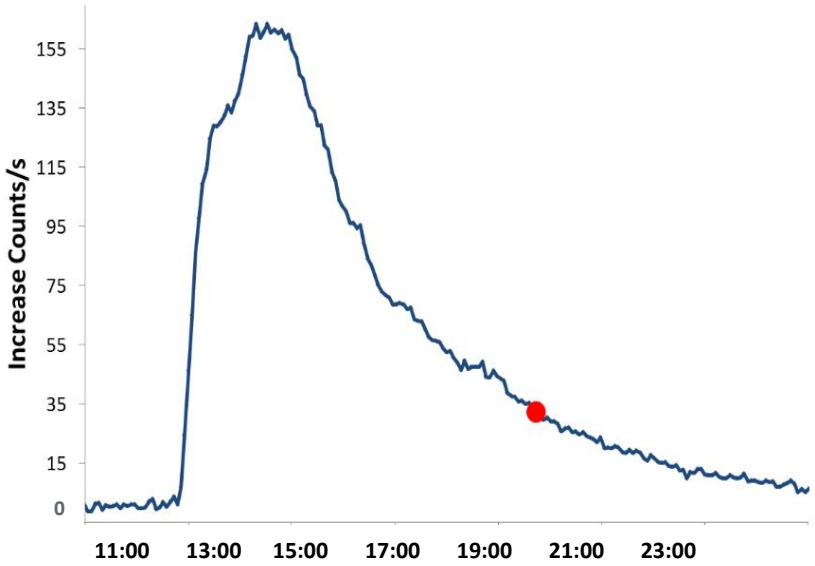

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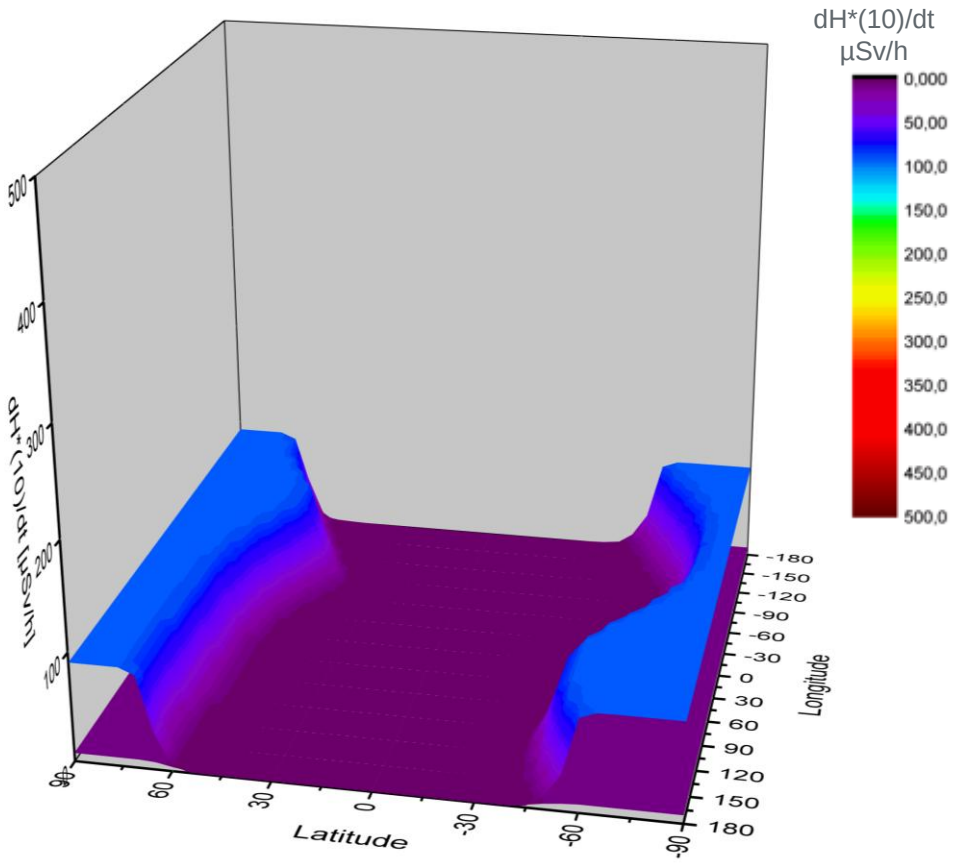

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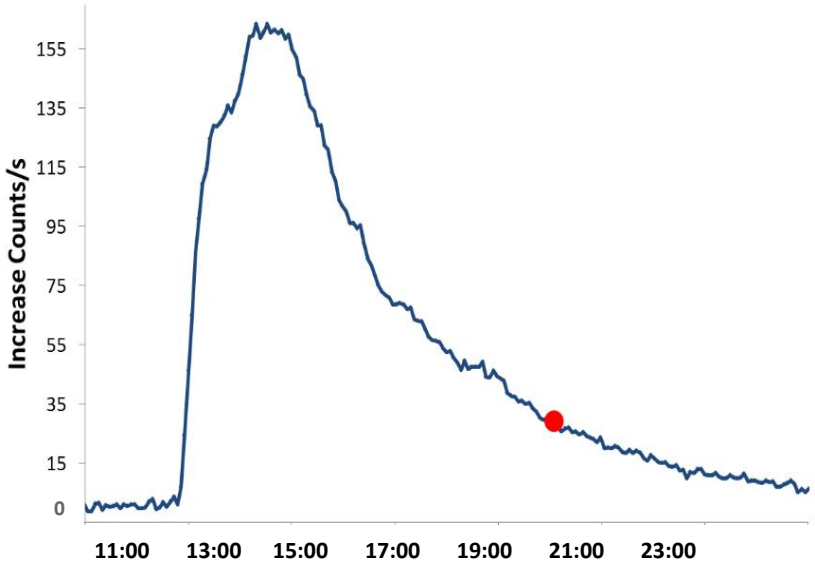

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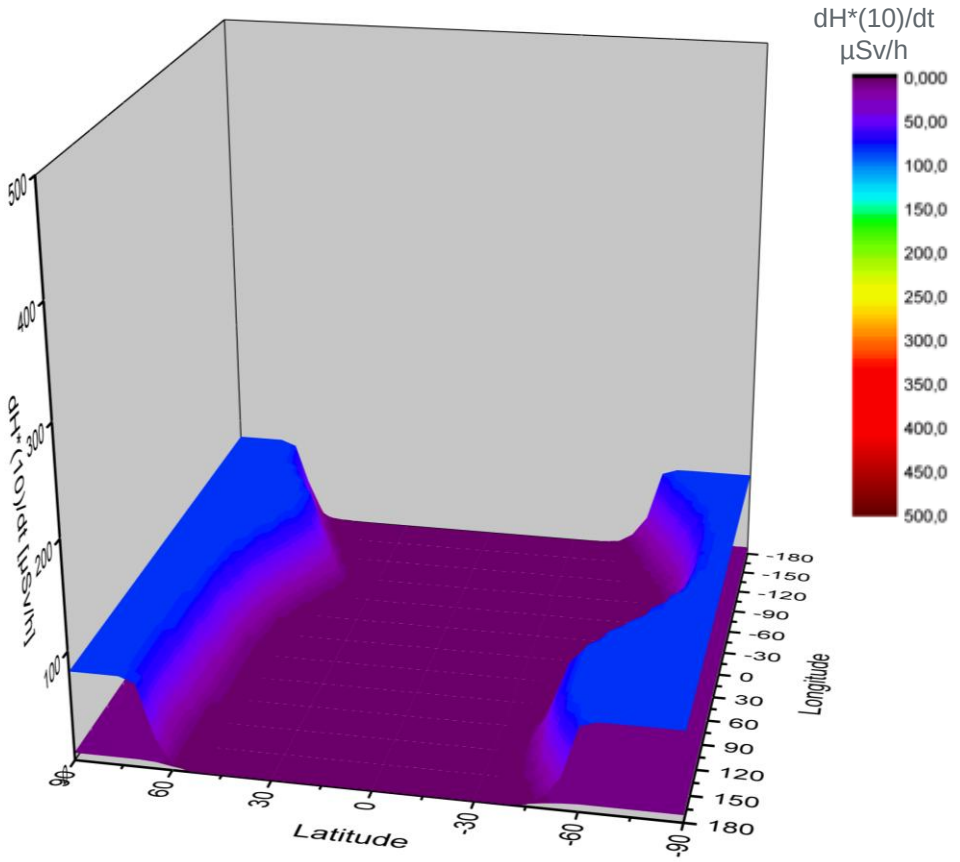
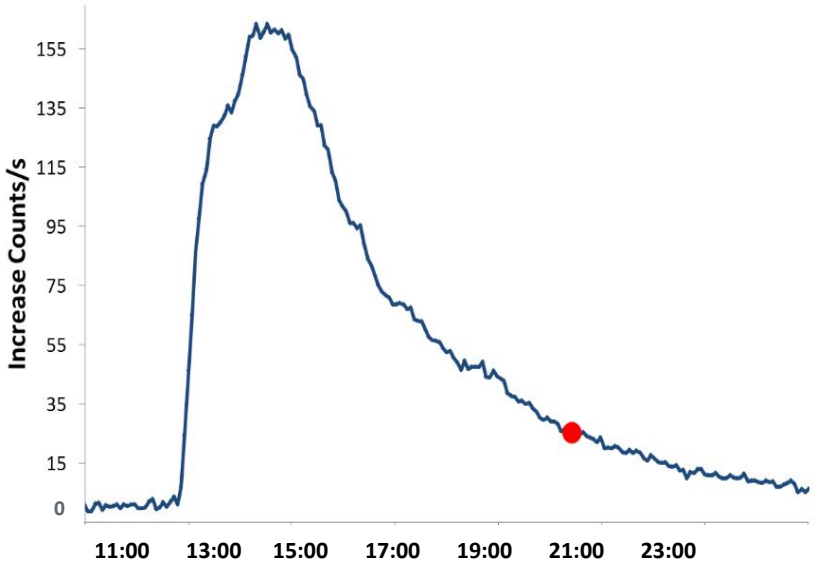
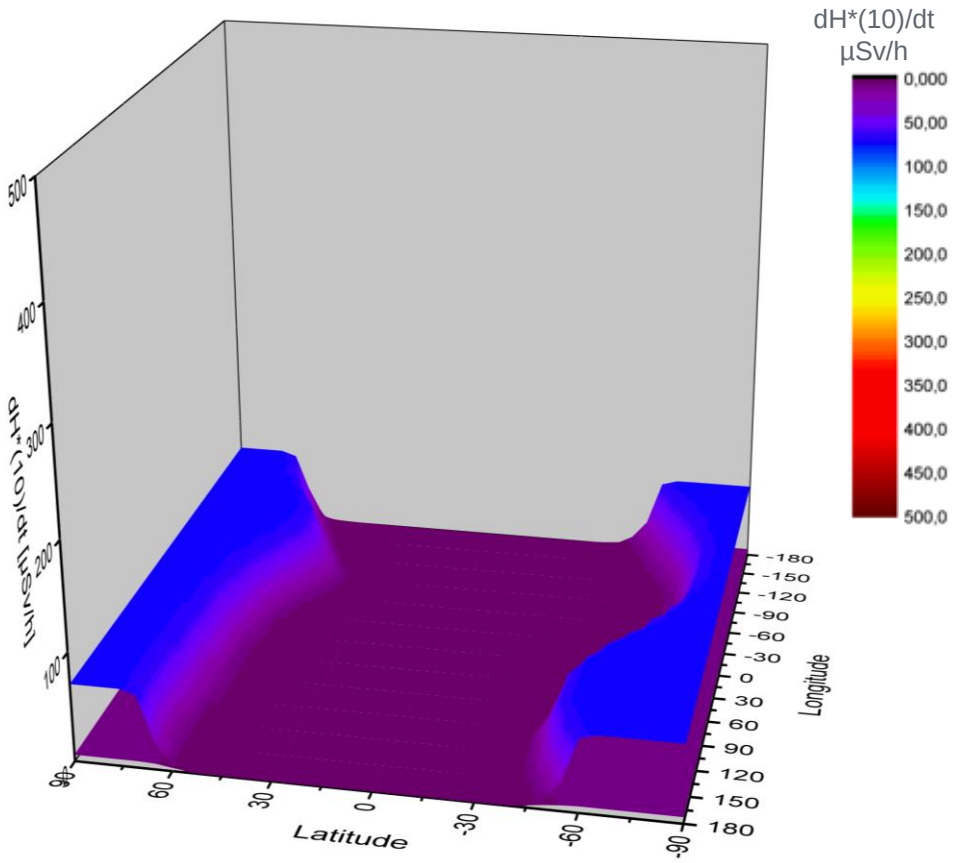


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 20:55:00

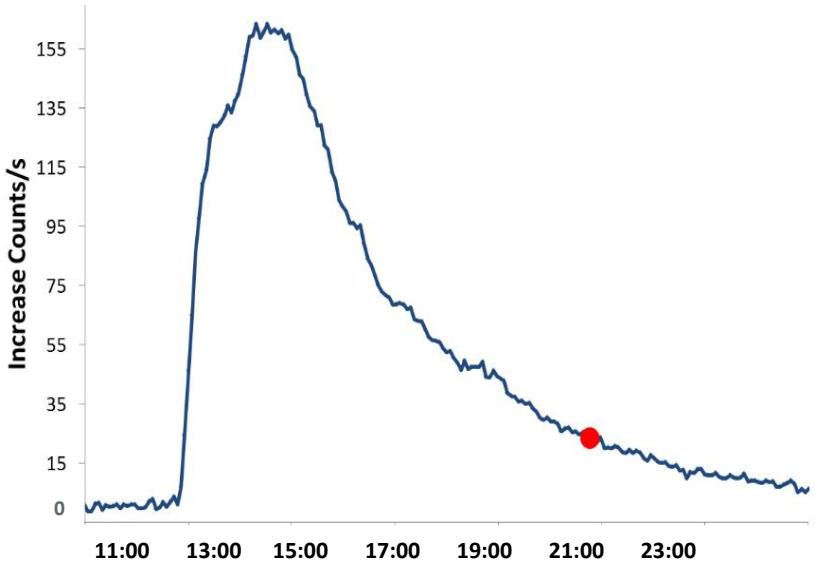


Neutron Monitor (Oulu)

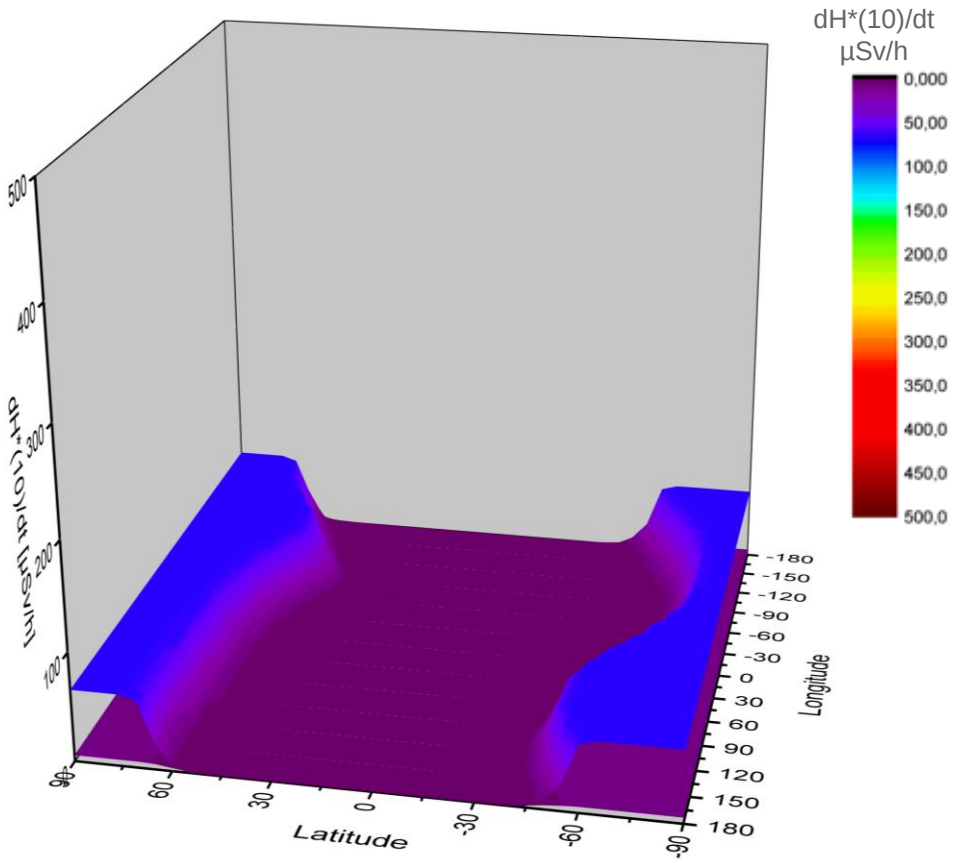


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 21:20:00

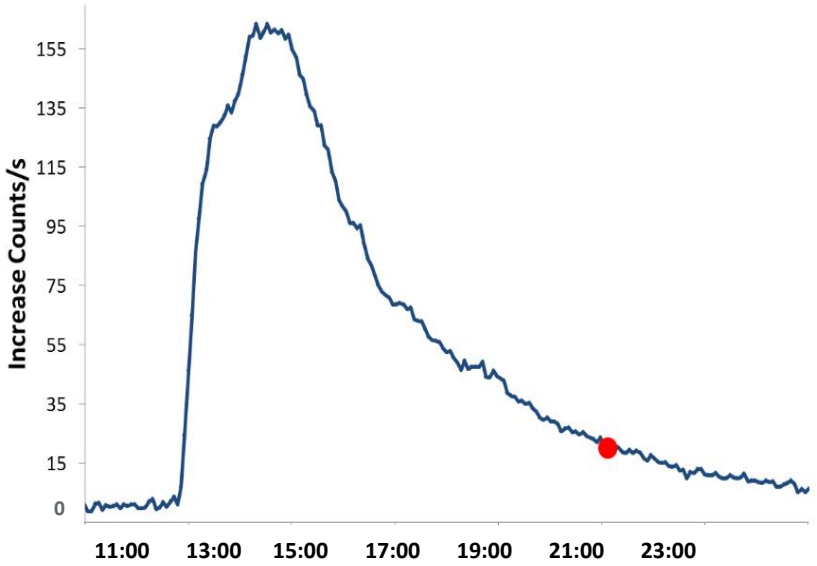


Neutron Monitor (Oulu)

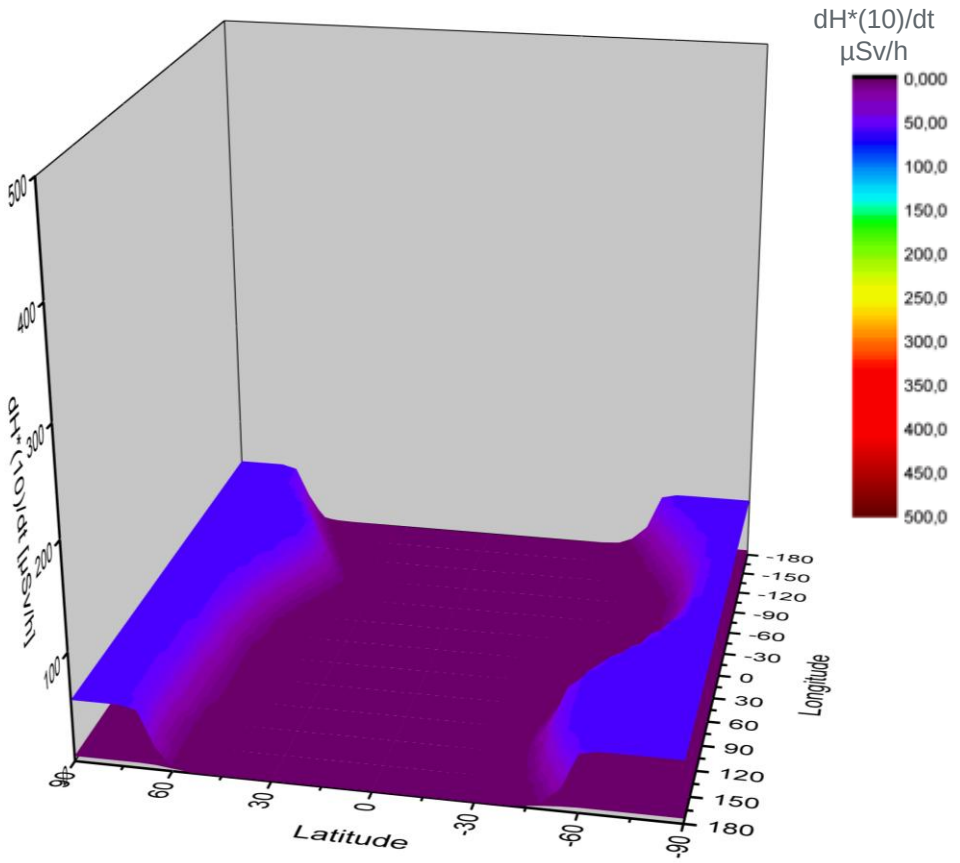


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 21:45:00

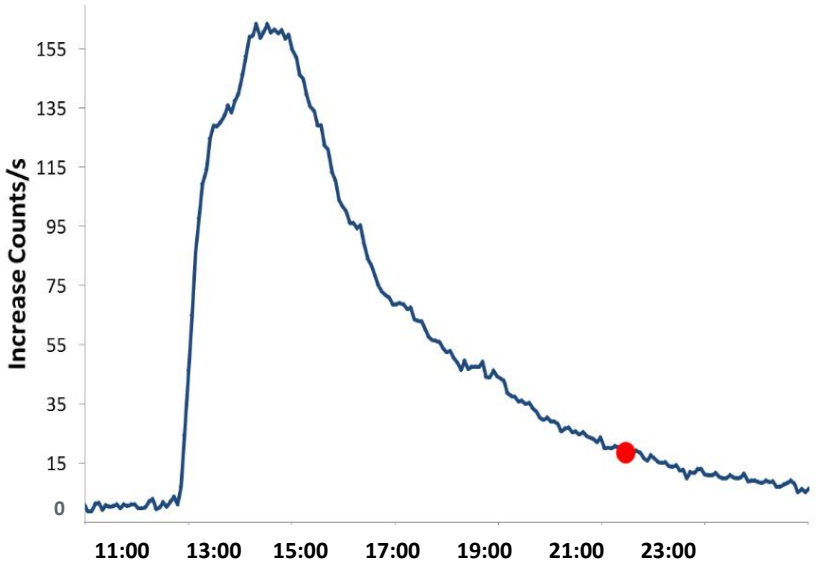


Neutron Monitor (Oulu)

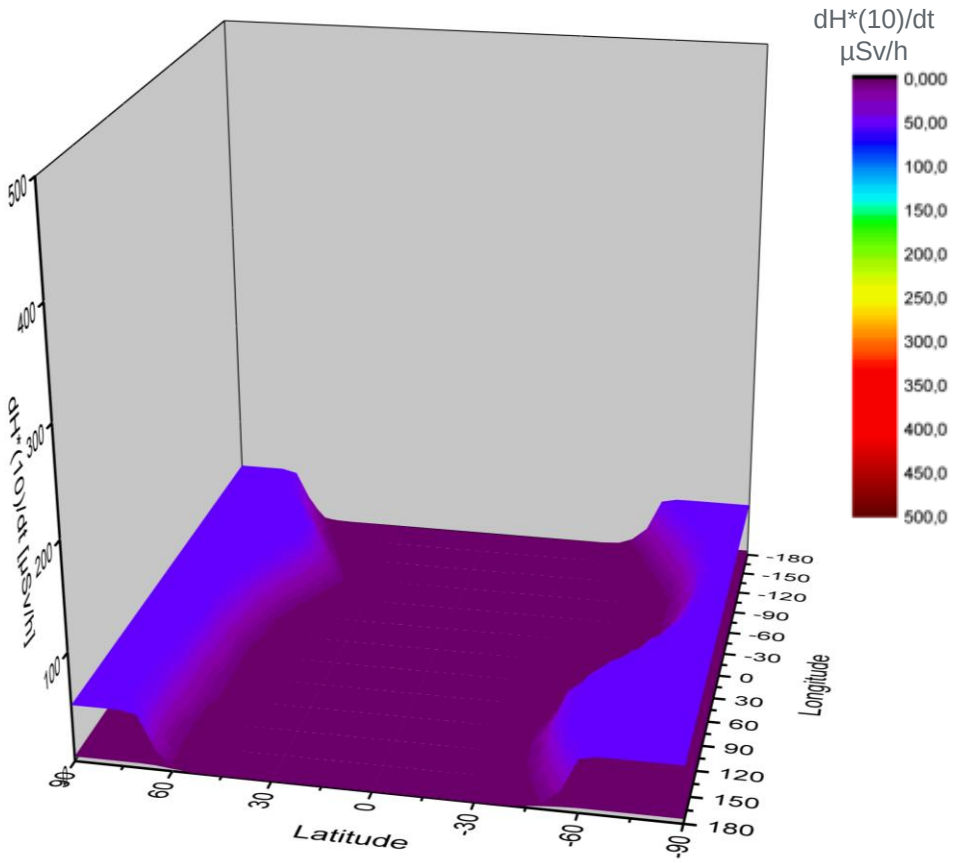


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 22:10:00

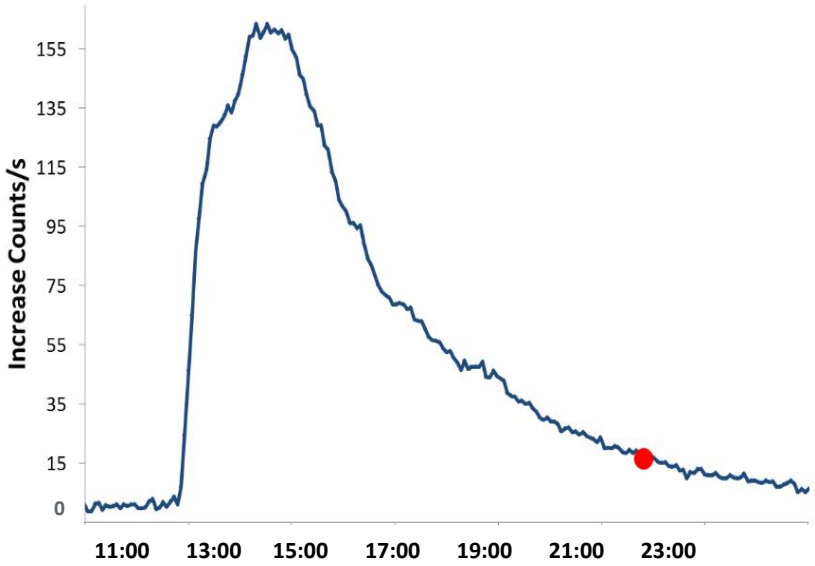


Neutron Monitor (Oulu)

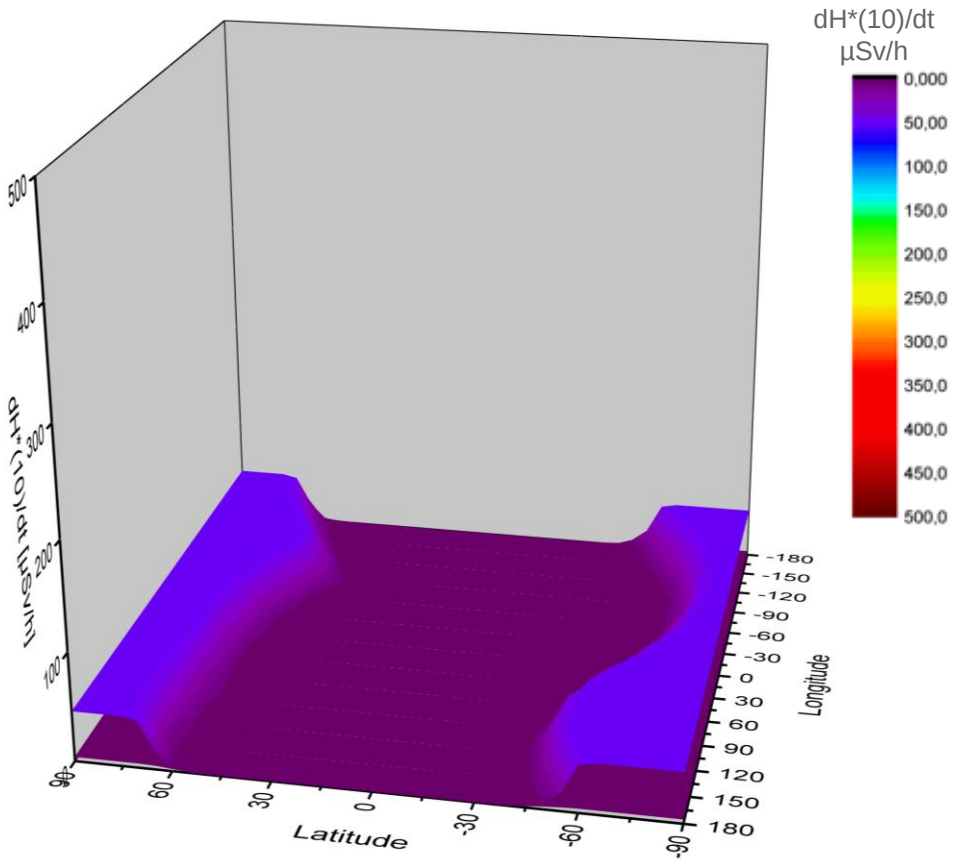


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 22:35:00

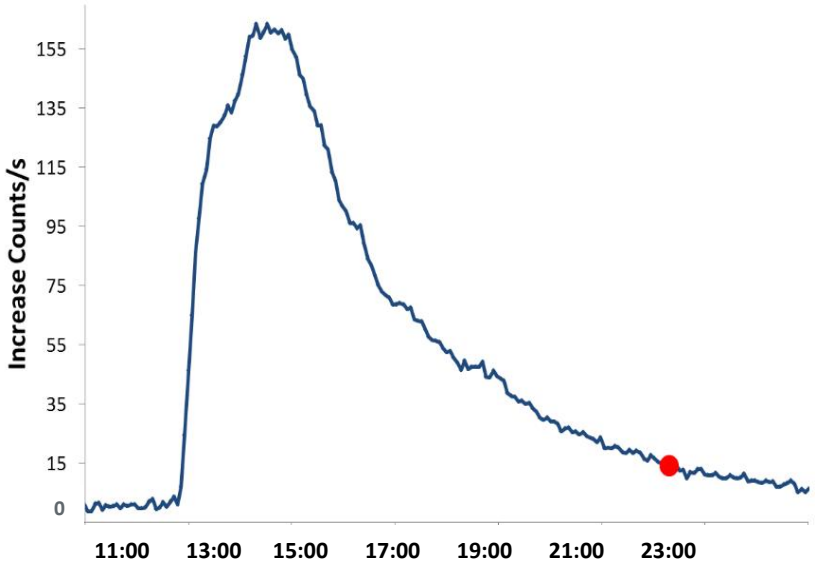


Neutron Monitor (Oulu)

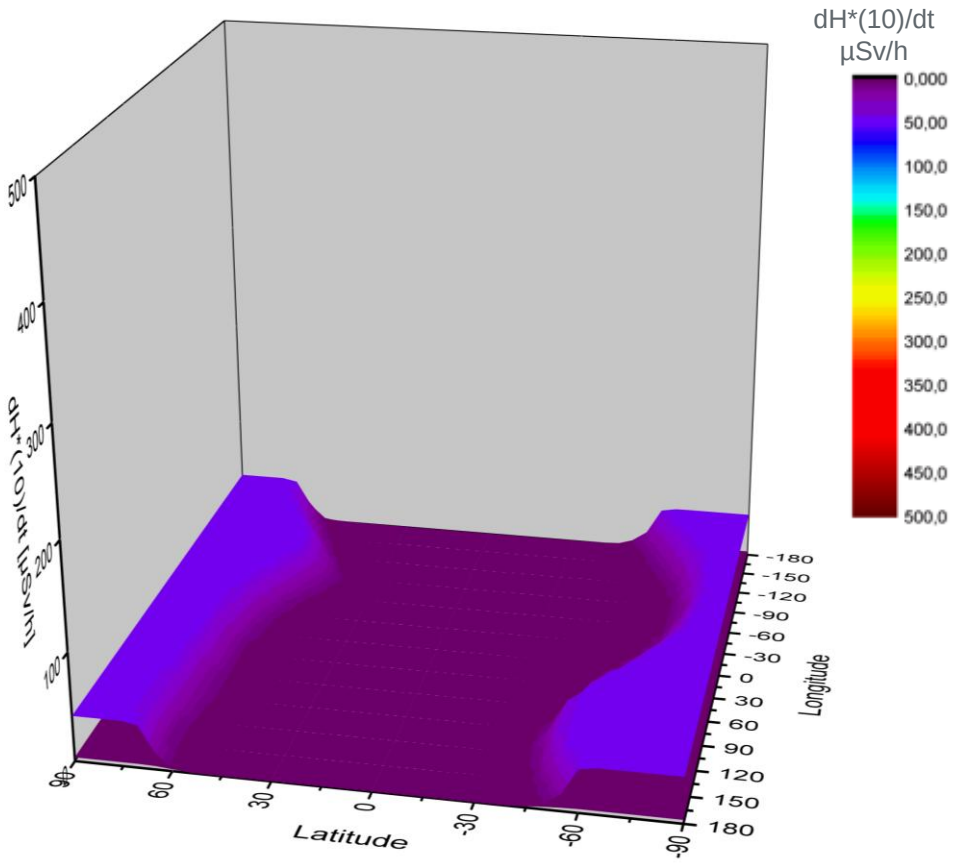


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 23:00:00

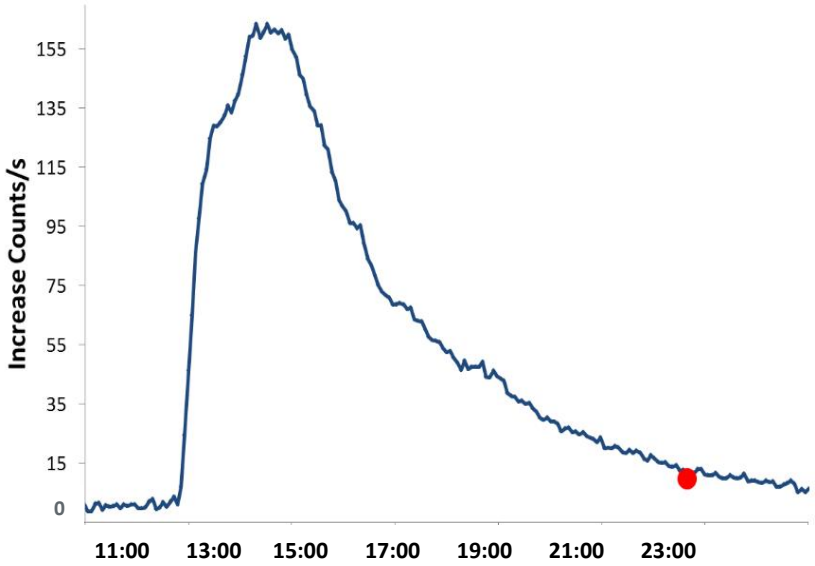


Neutron Monitor (Oulu)

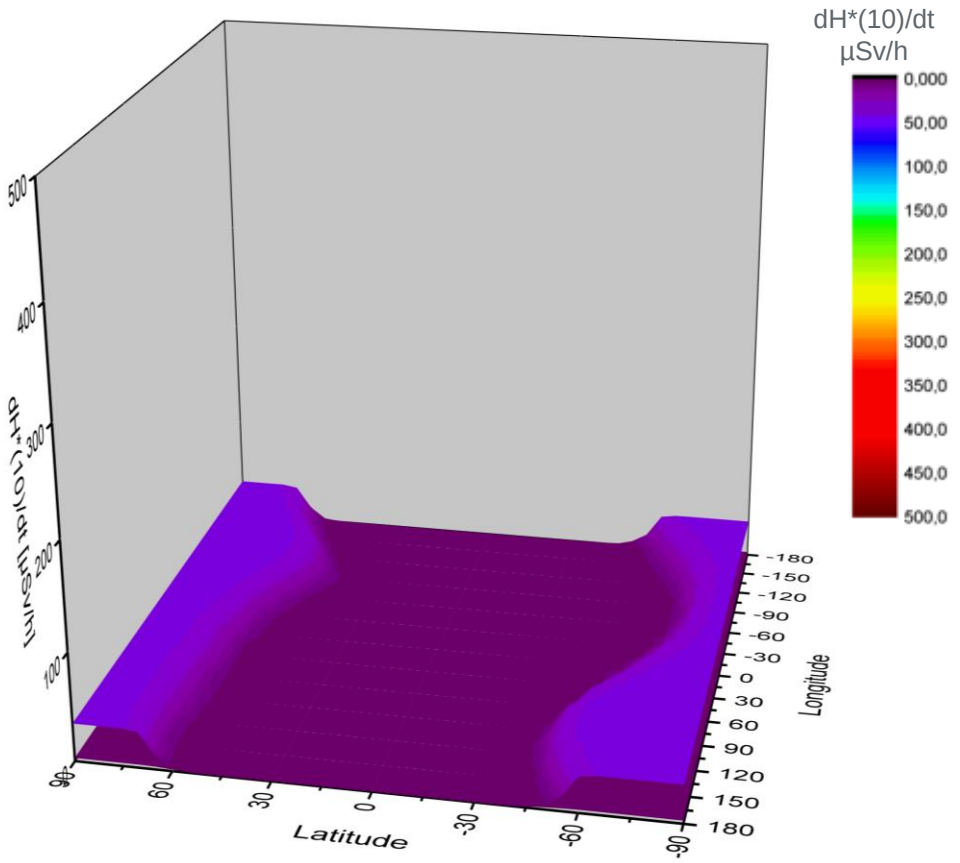


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

29 Sept 1989 23:25:00

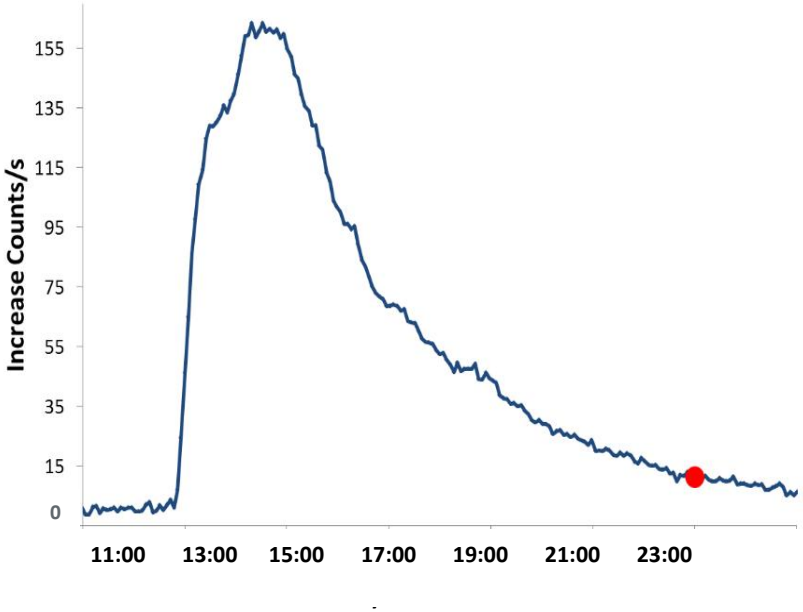


Neutron Monitor (Oulu)

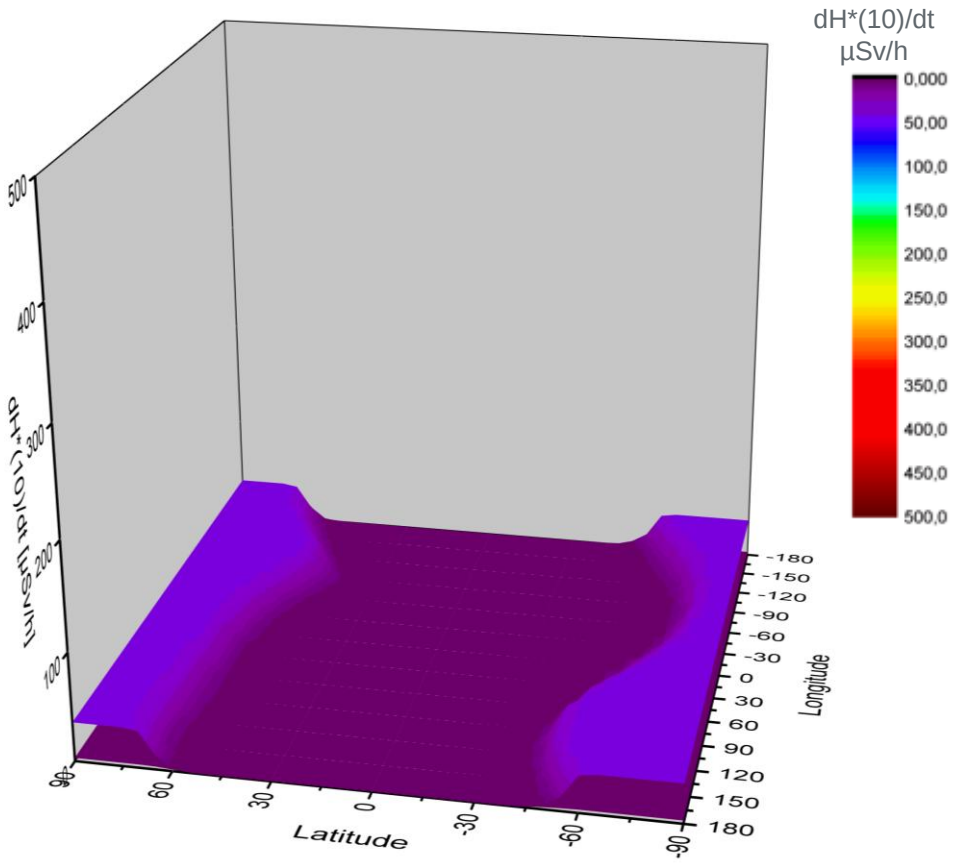


AVIDOS 2.0 Nowcast of Radiation Exposure at 10.7 km Altitude (FL350) during GLE42

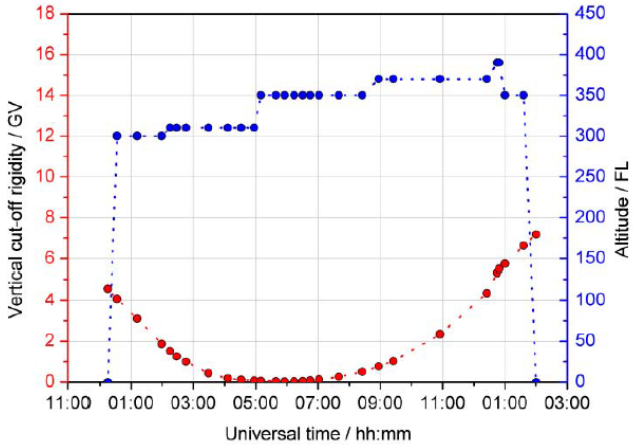
29 Sept 1989 23:50:00



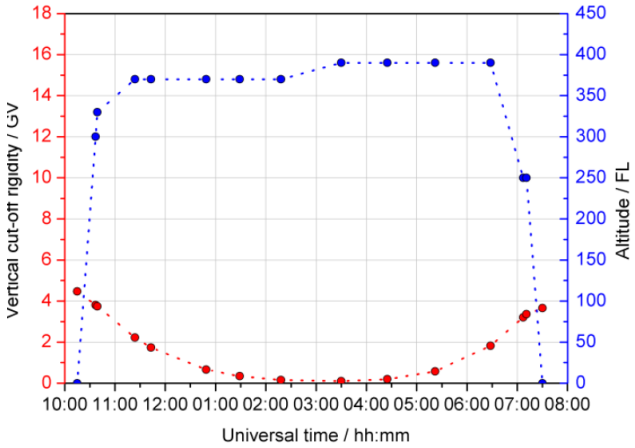
Neutron Monitor (Oulu)



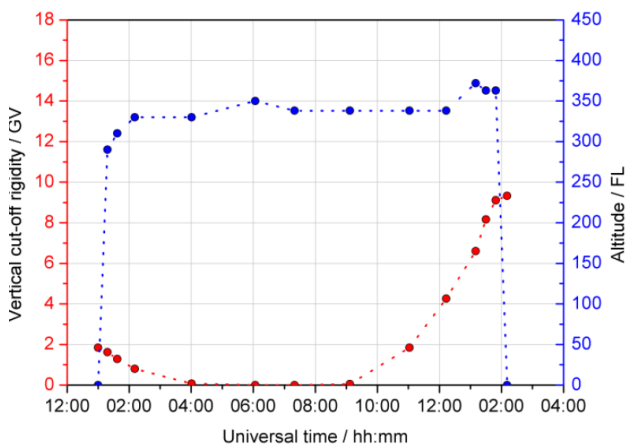
Selected flight routes during GLE42



Southern hemisphere
Sydney – Johannesburg



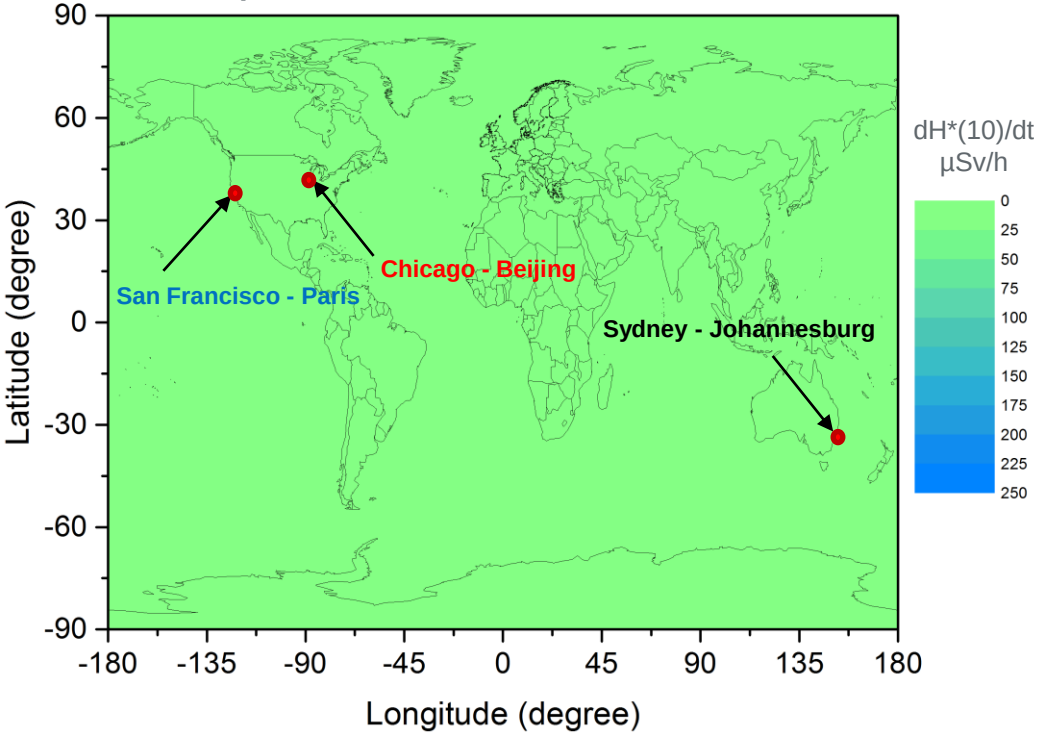
Transatlantic
San Francisco – Paris



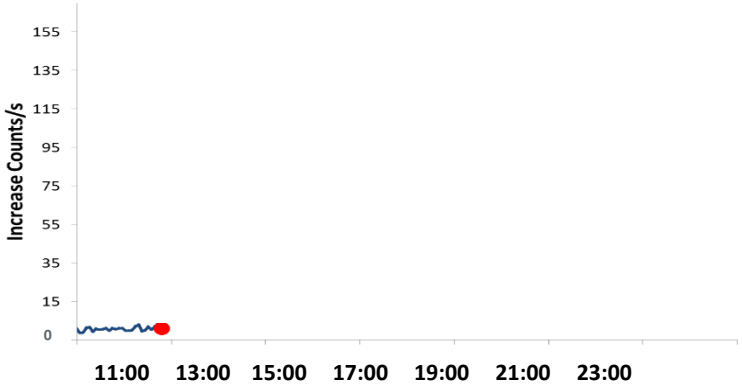
North Pole
Chicago – Beijing

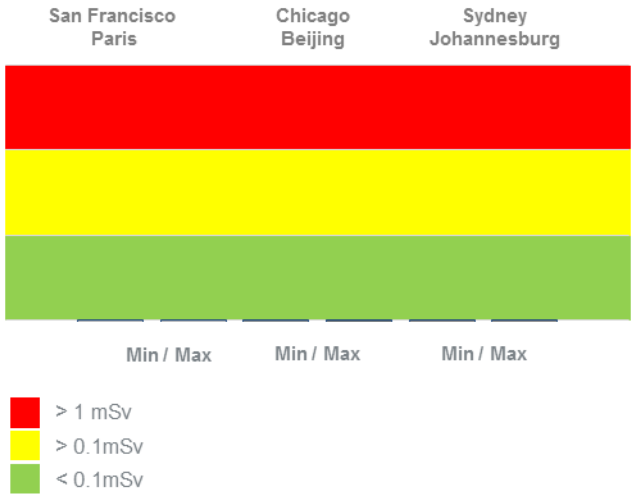
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 11:45:00



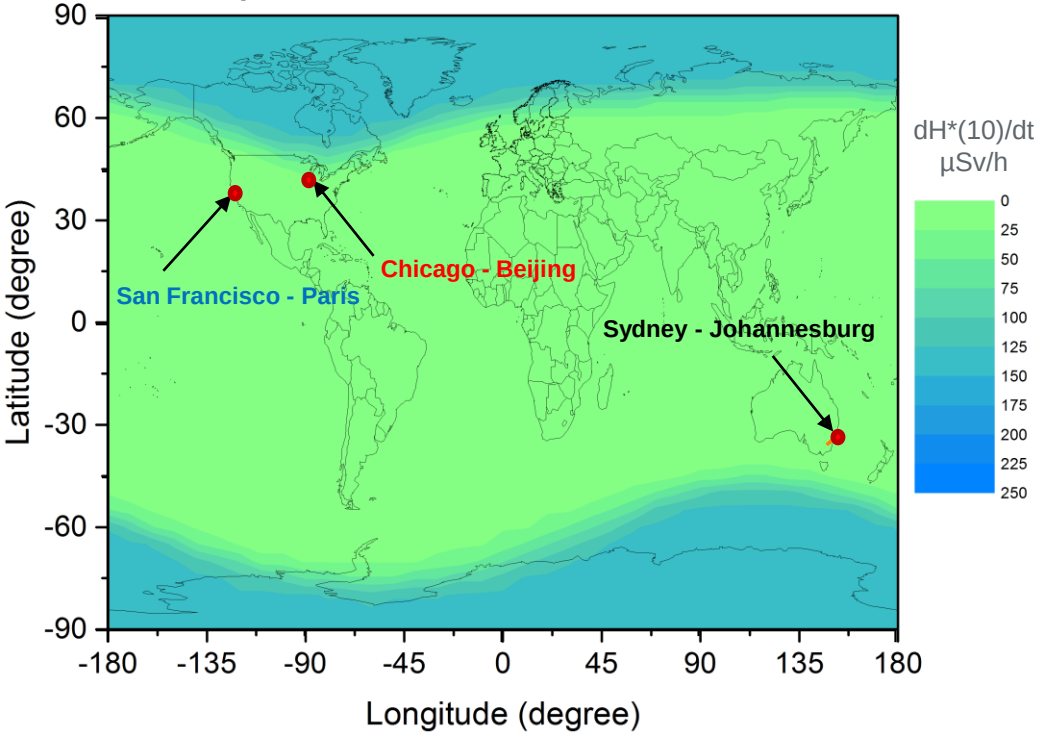
Neutron Monitor (Oulu)



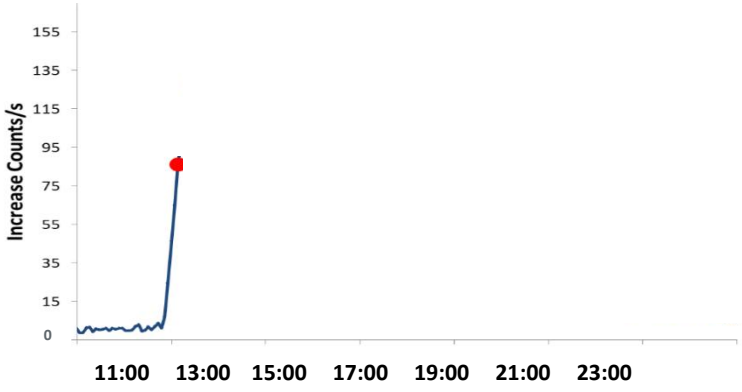


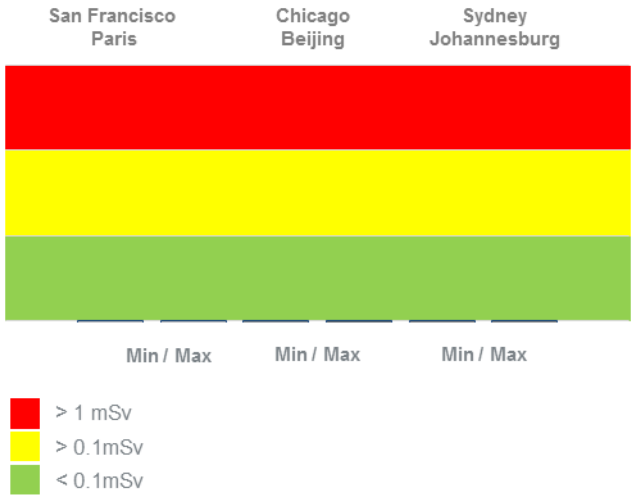
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 12:10:00



Neutron Monitor (Oulu)





AVIDOS 2.0 Nowcast during GLE42

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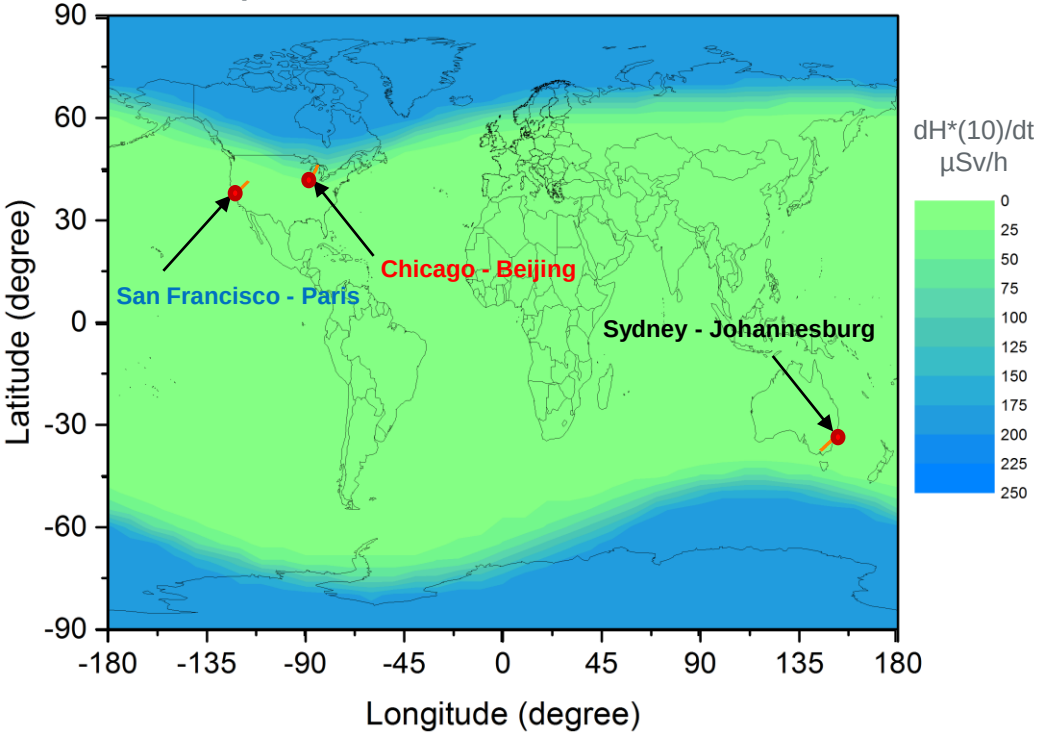

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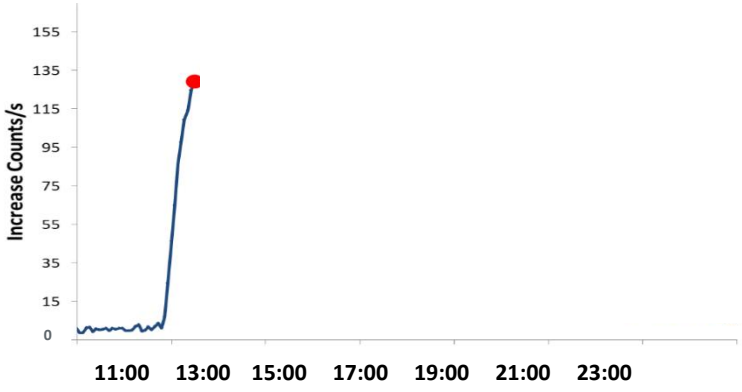
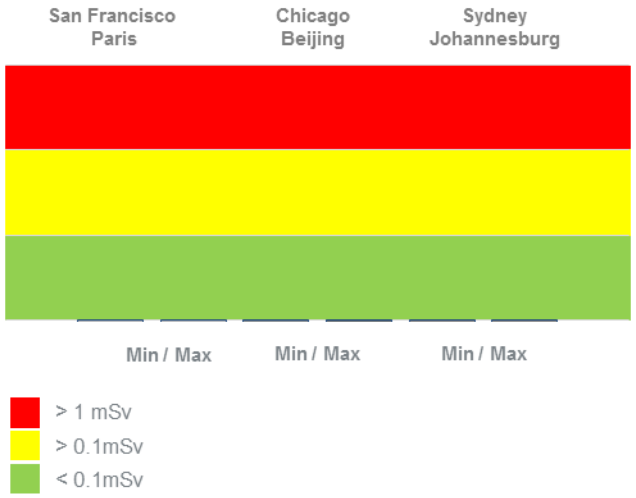
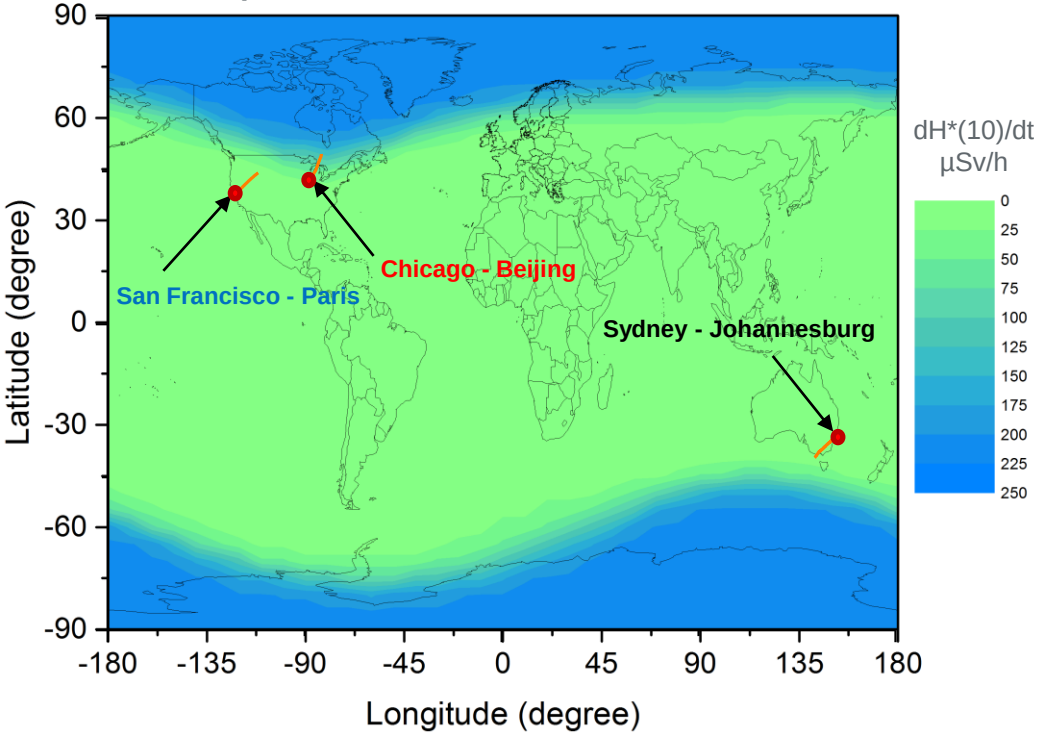




AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 13:00:00



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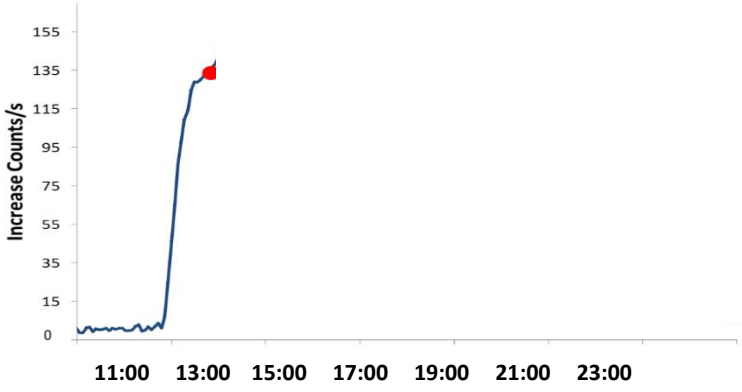
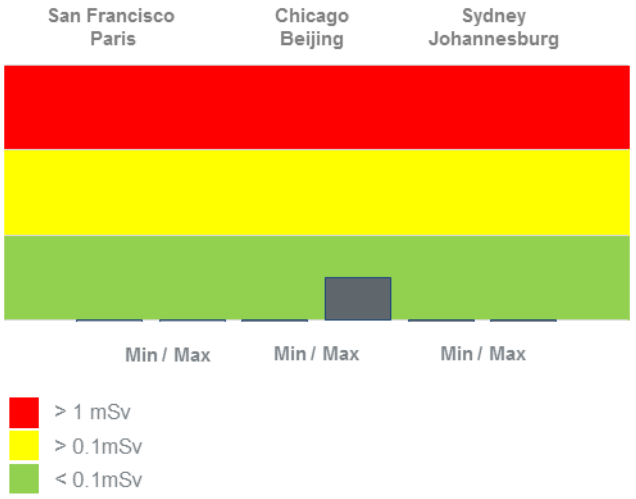
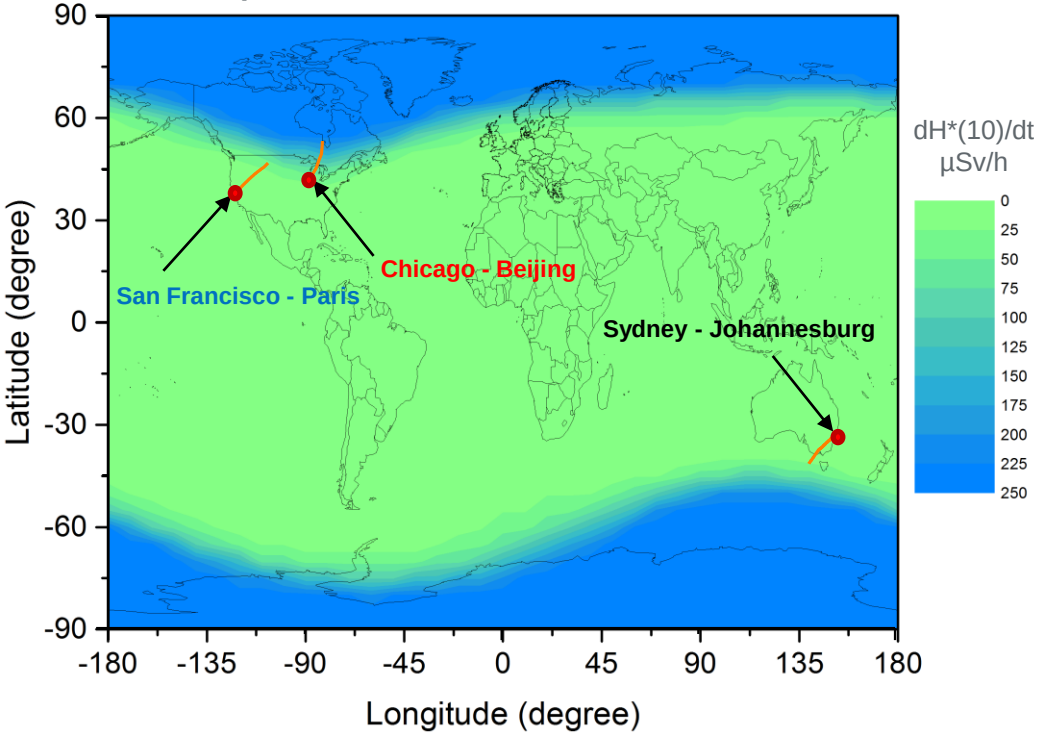




AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 13:25:00



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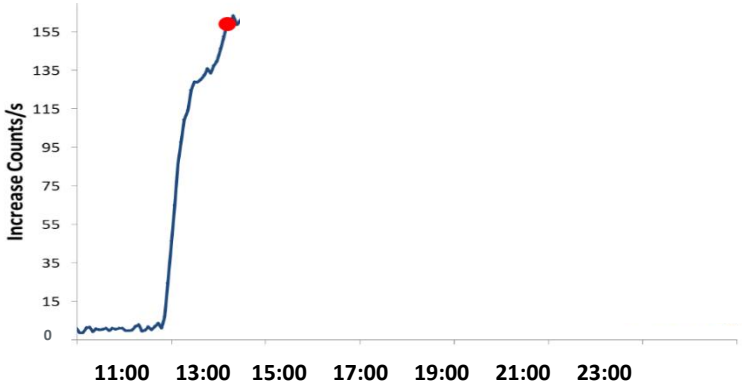
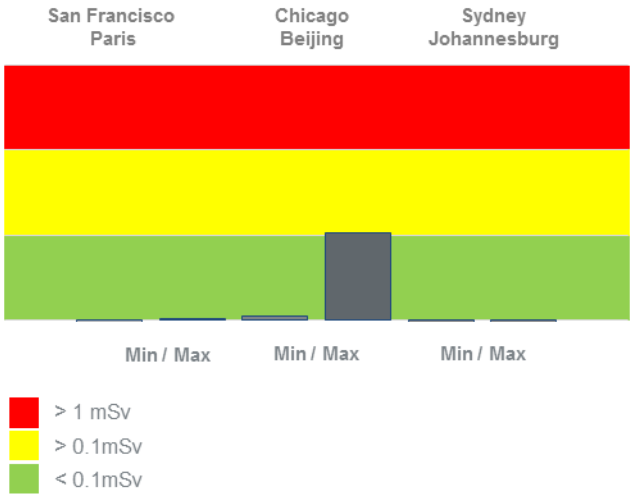
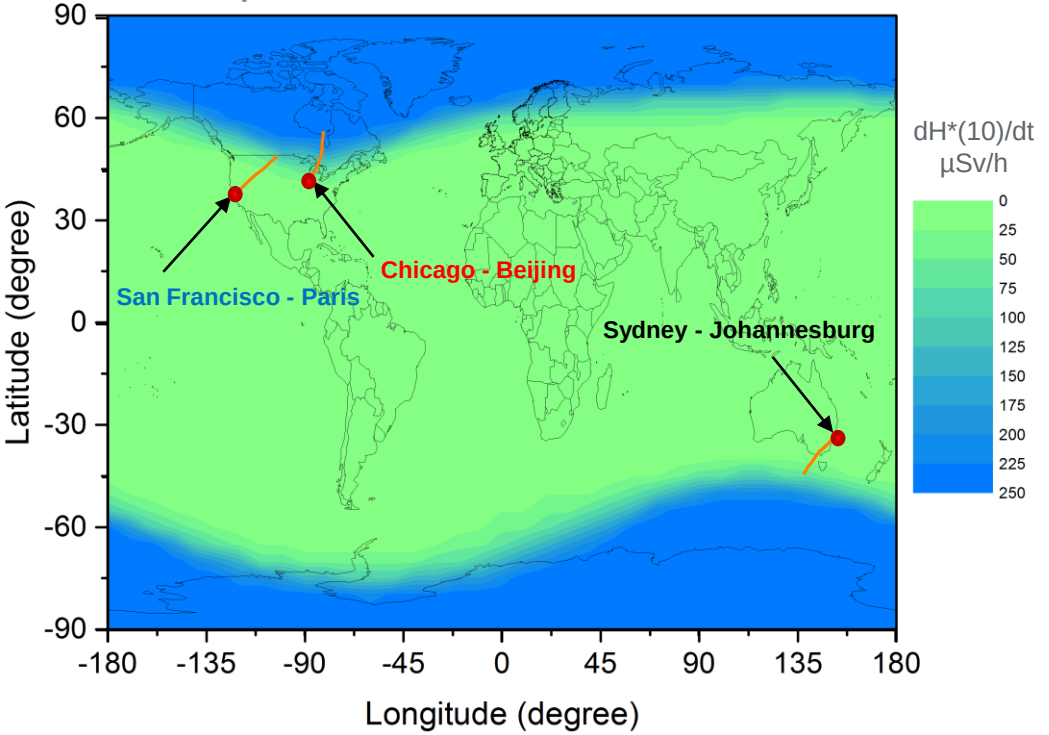


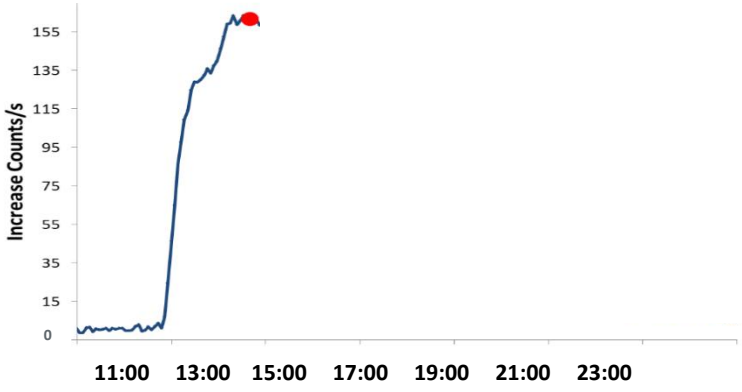


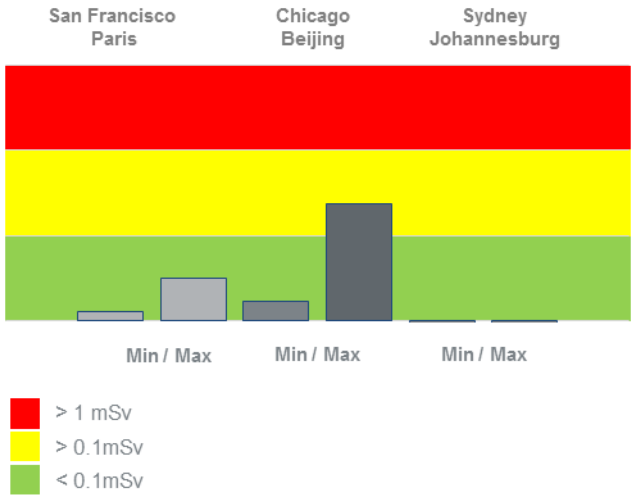
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 13:50:00



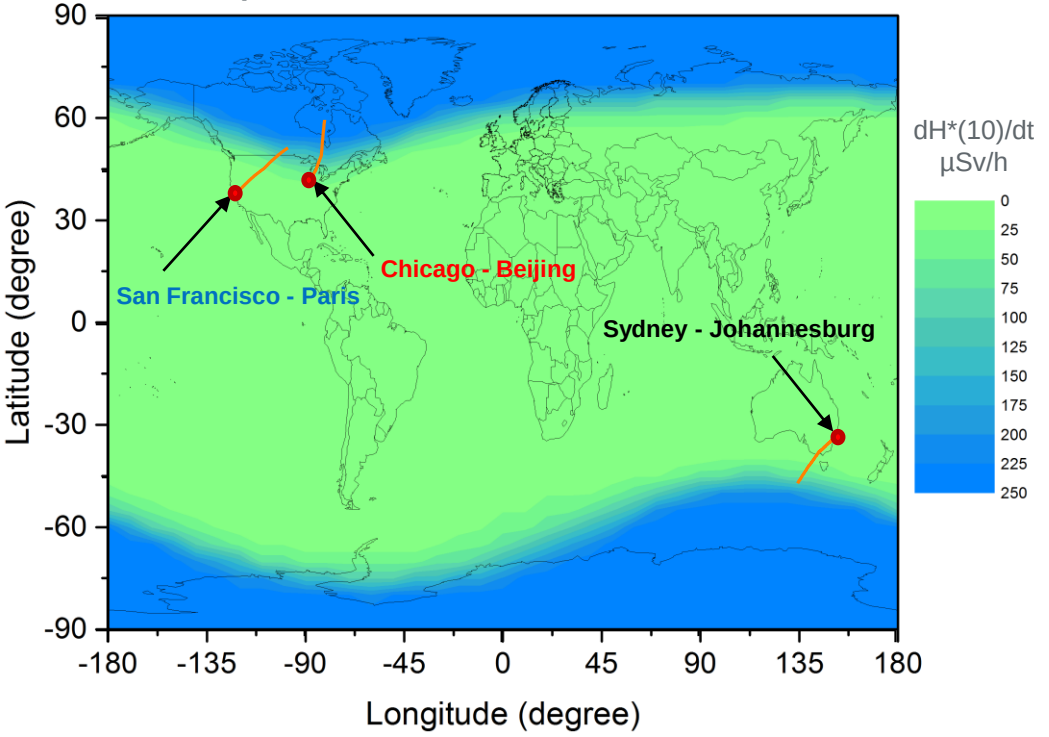
Neutron Monitor (Oulu)



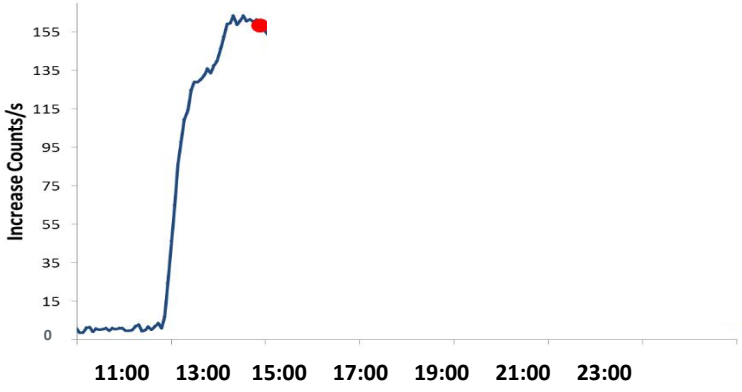


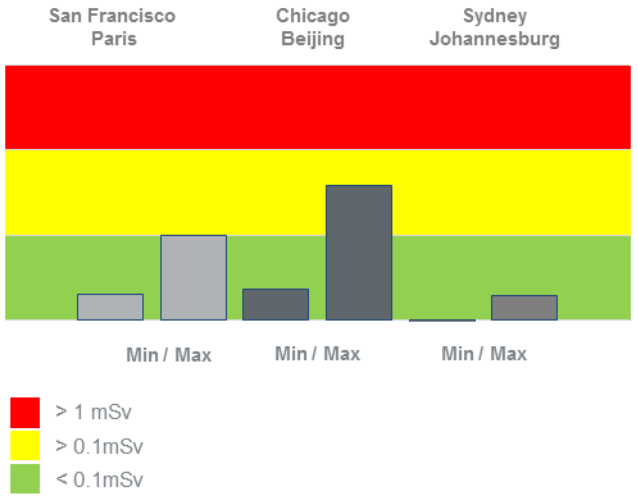
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 14:15:00



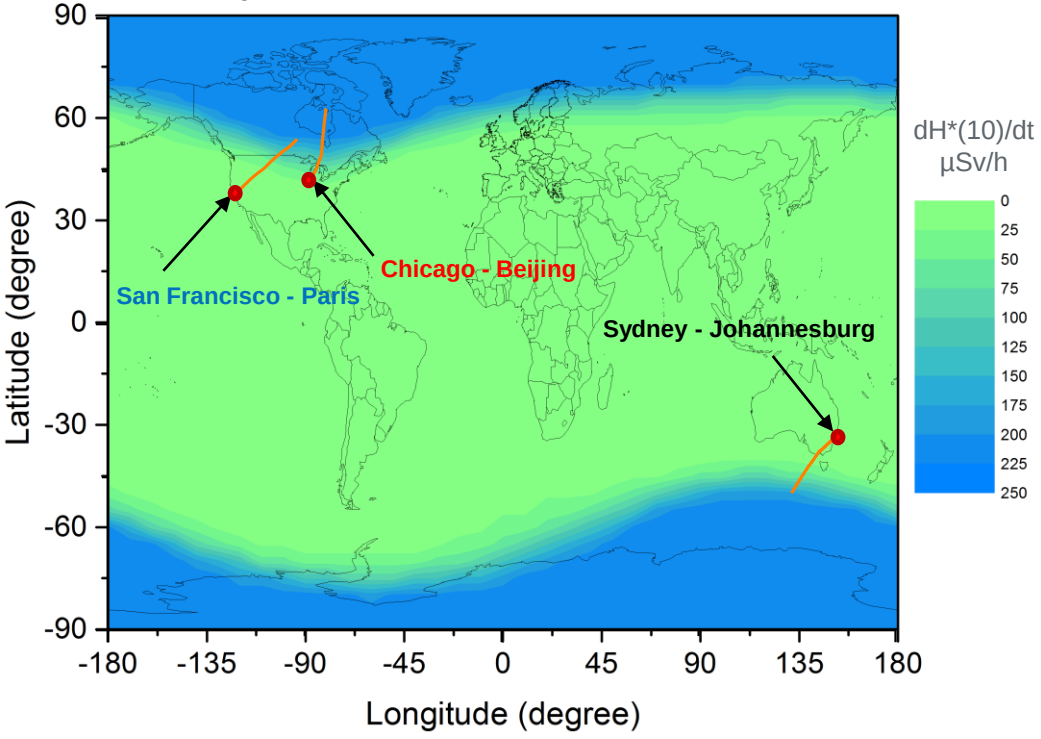
Neutron Monitor (Oulu)



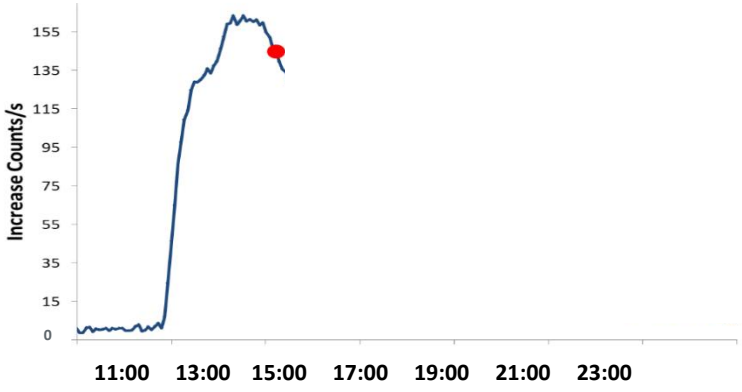


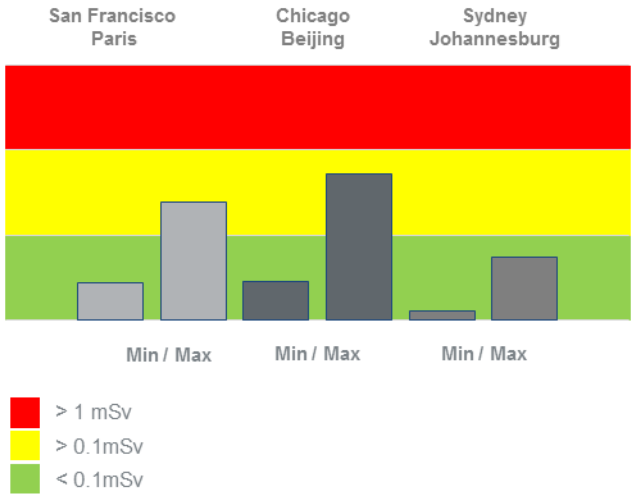
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 14:40:00



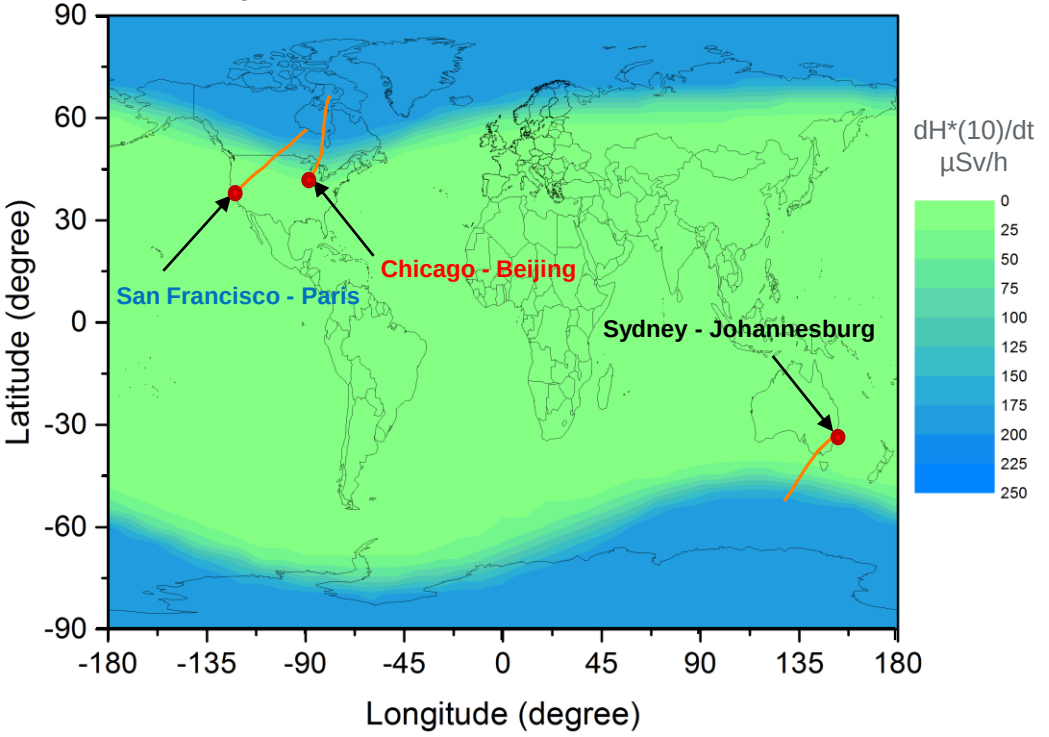
Neutron Monitor (Oulu)



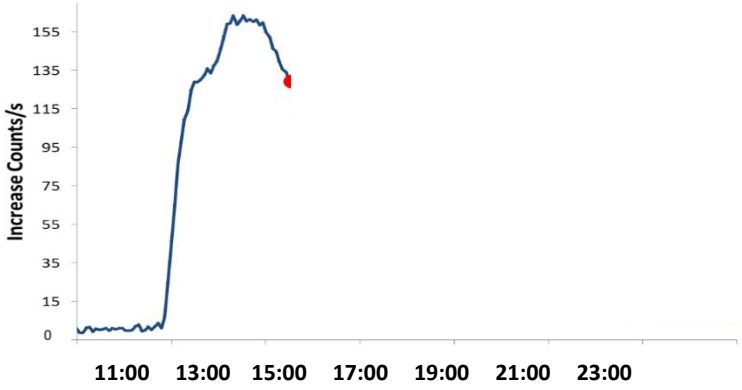


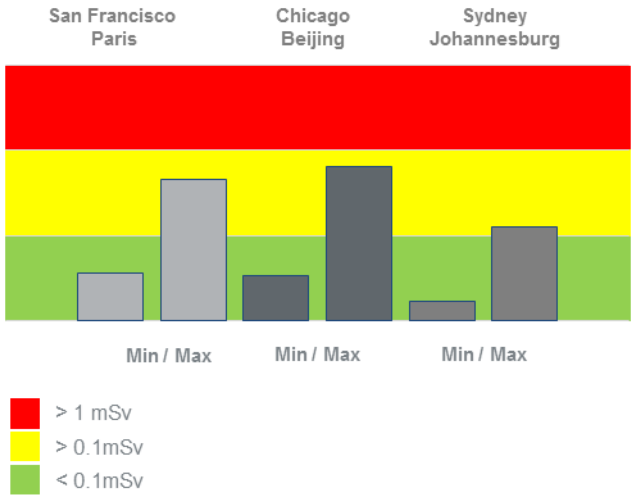
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 15:05:00



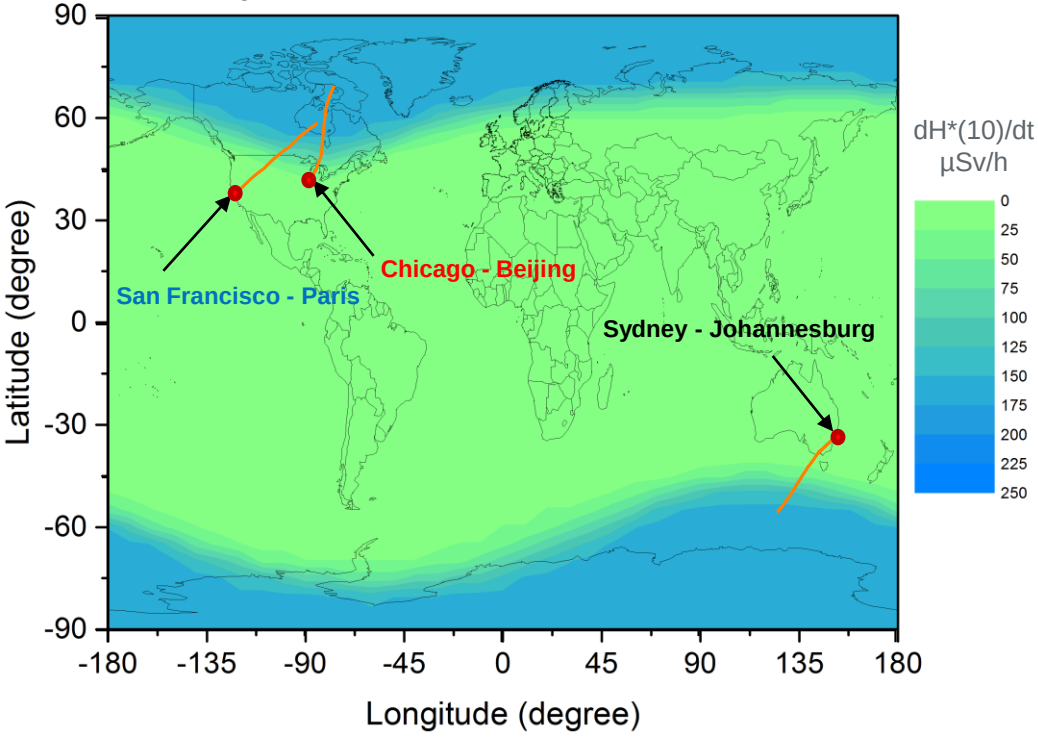
Neutron Monitor (Oulu)



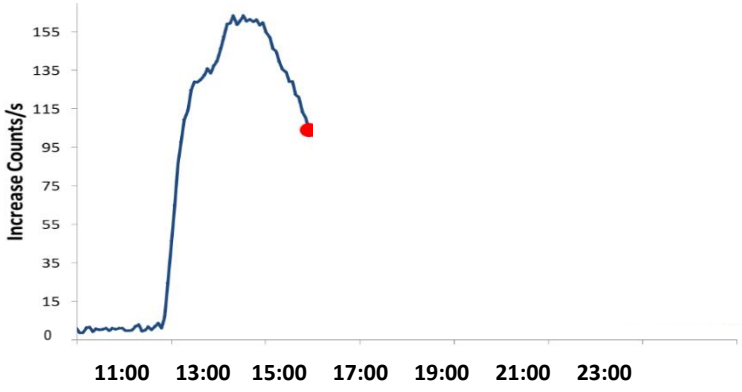


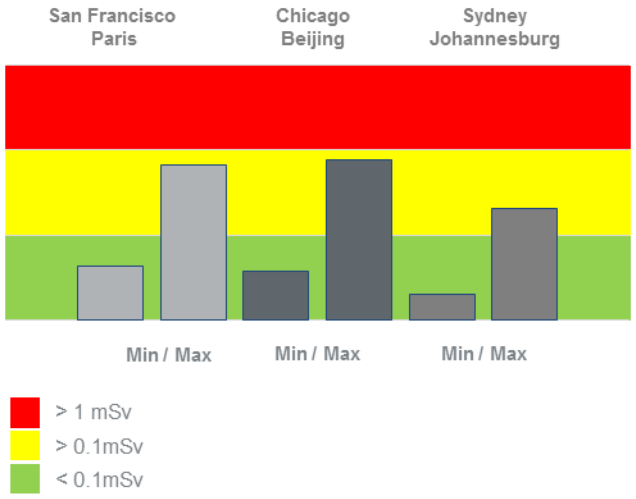
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 15:30:00



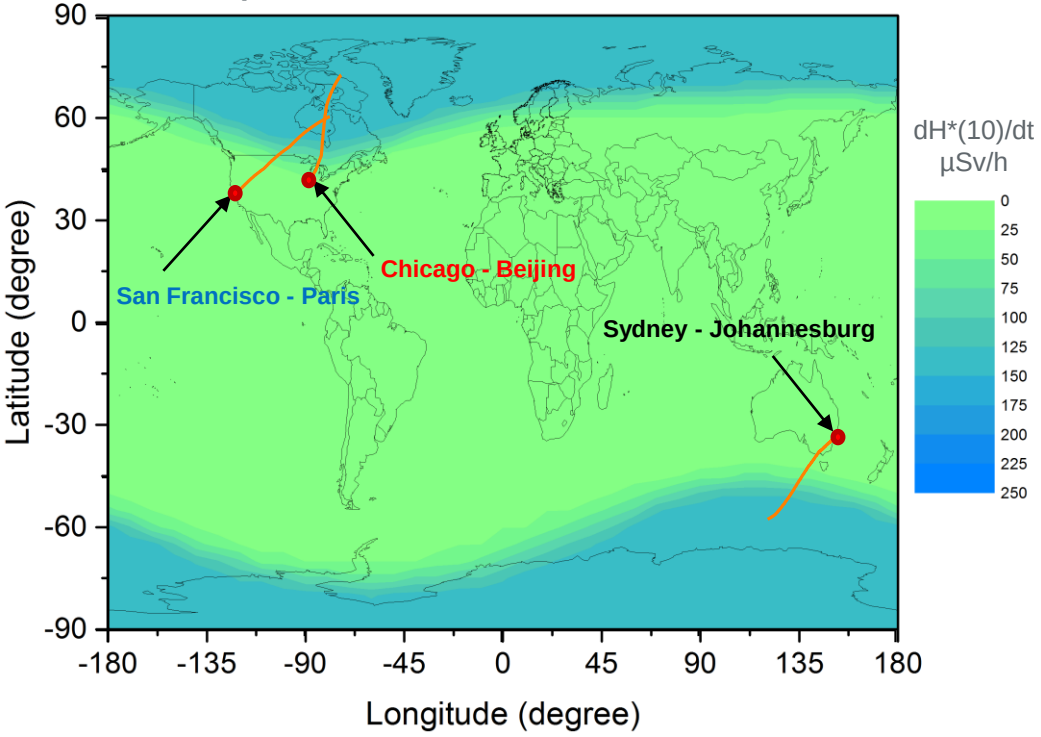
Neutron Monitor (Oulu)



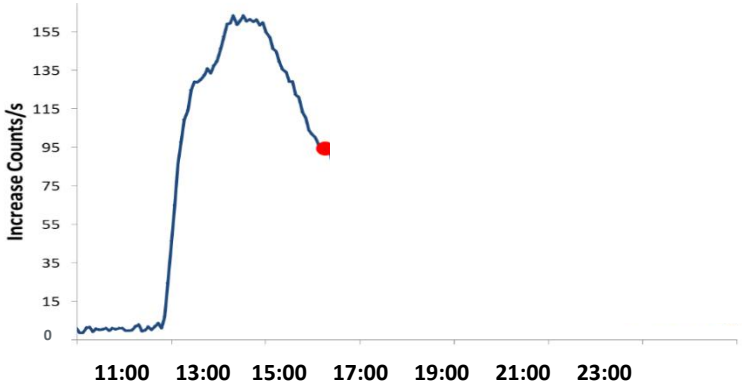


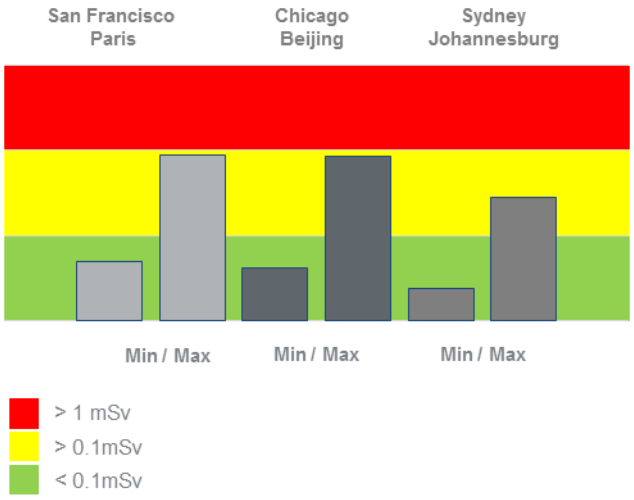
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 15:55:00



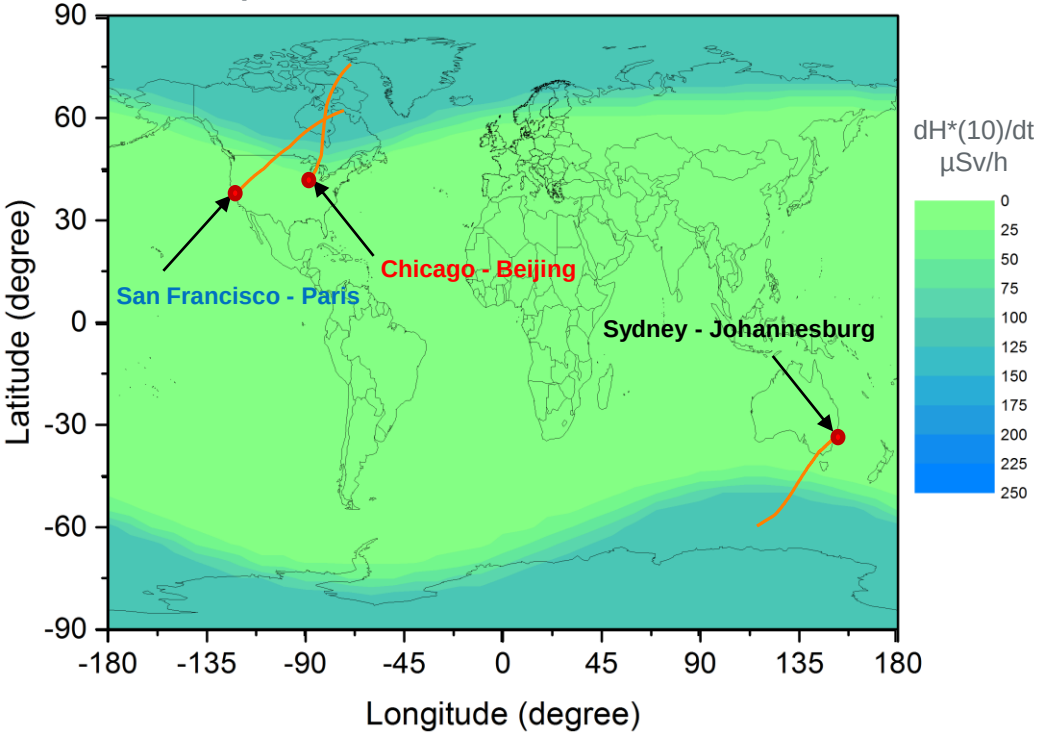
Neutron Monitor (Oulu)



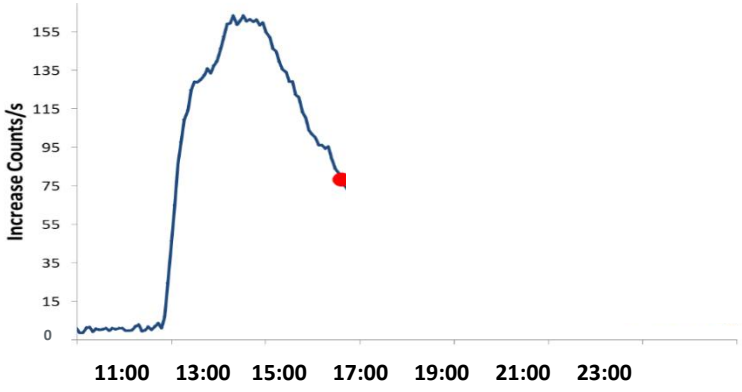


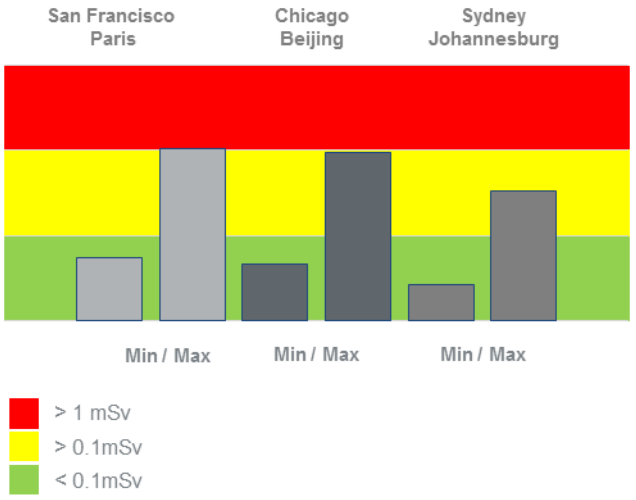
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 16:20:00



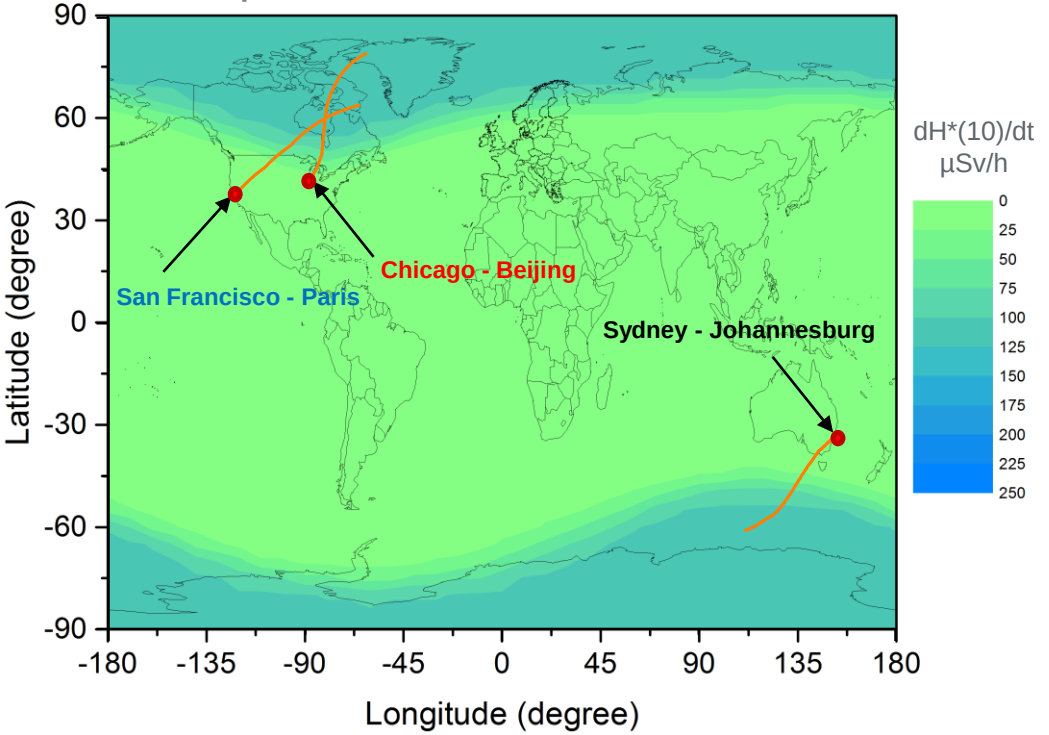
Neutron Monitor (Oulu)



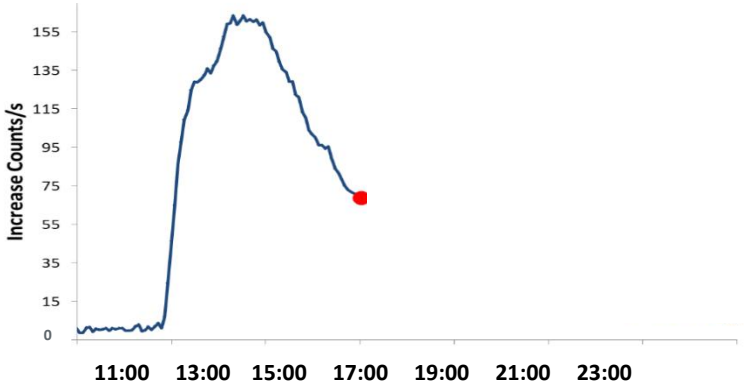


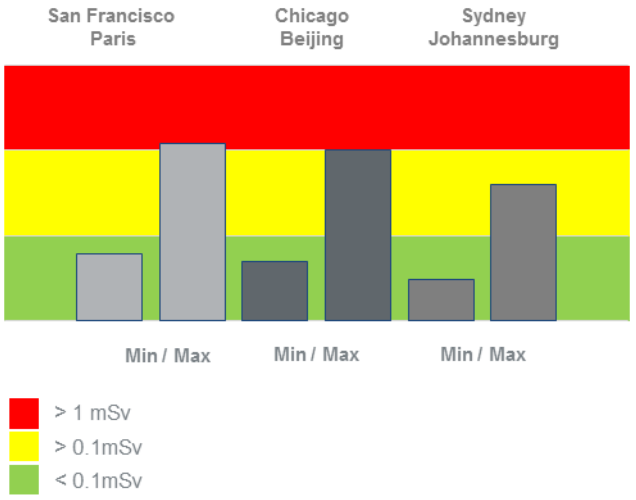
AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 16:45:00



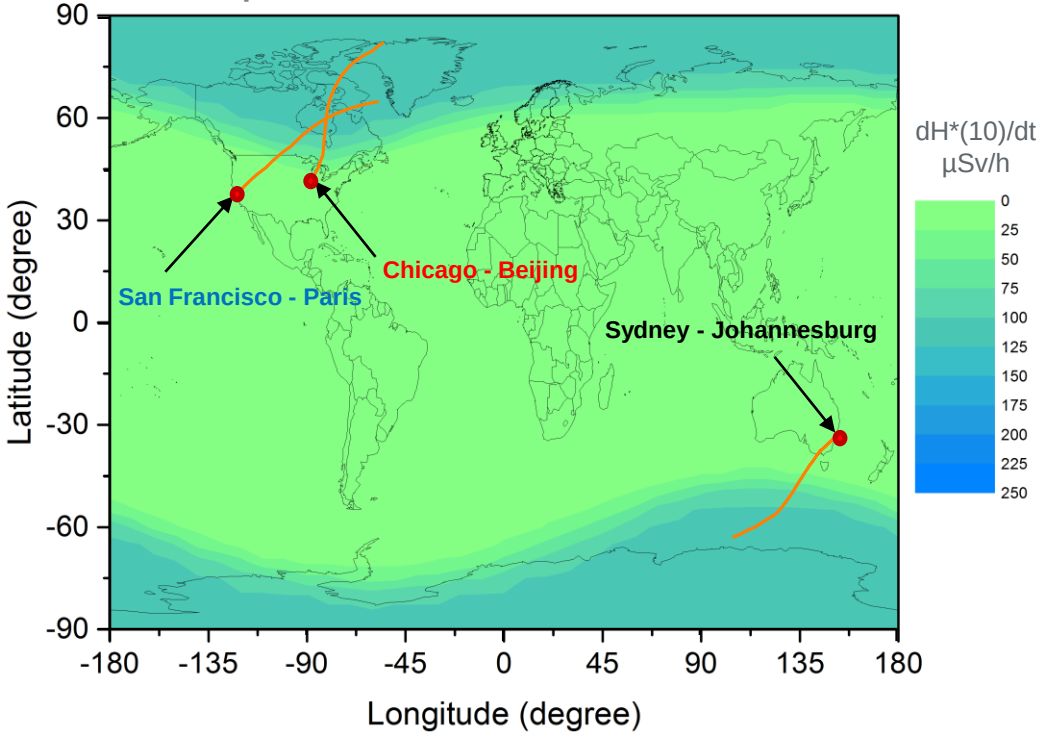
Neutron Monitor (Oulu)





AVIDOS 2.0 Nowcast during GLE42

29 Sept 1989 17:10:00



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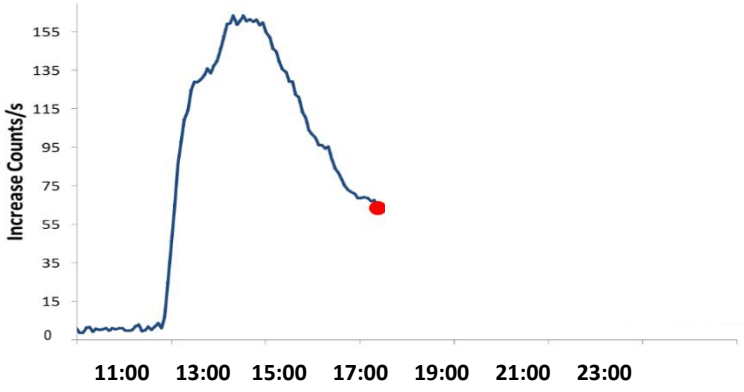

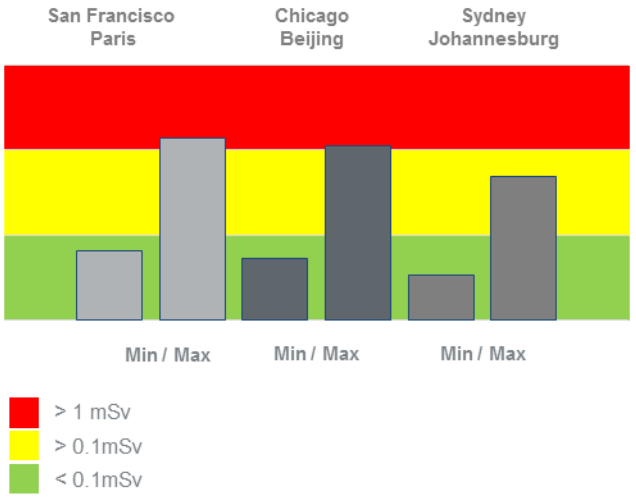

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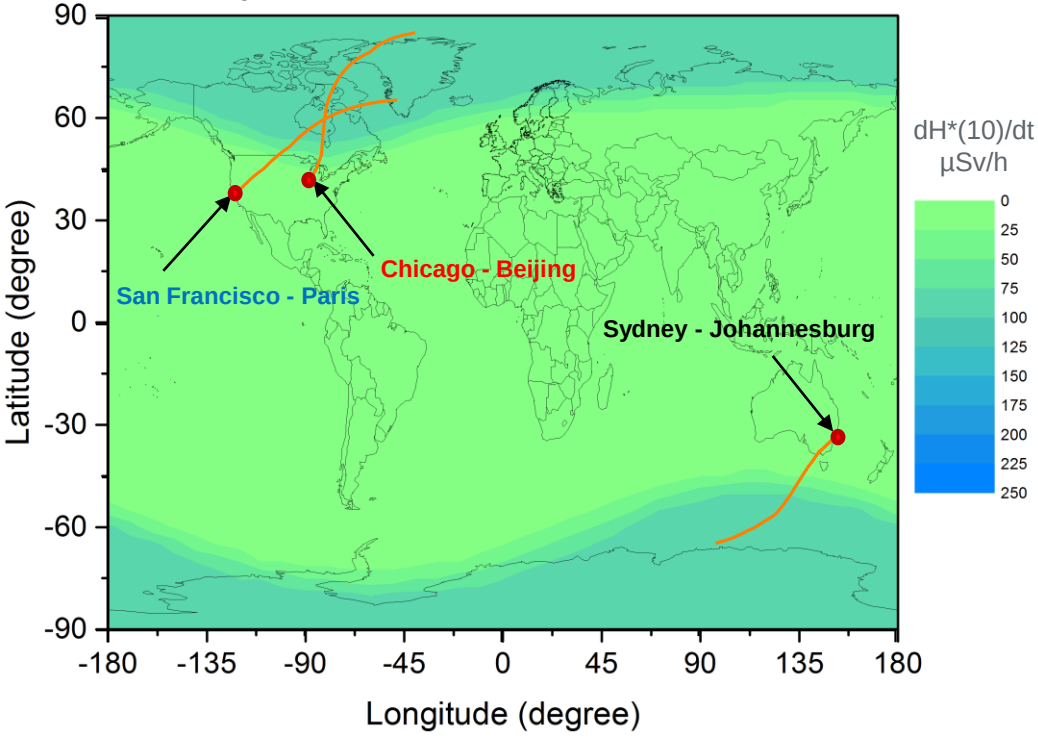

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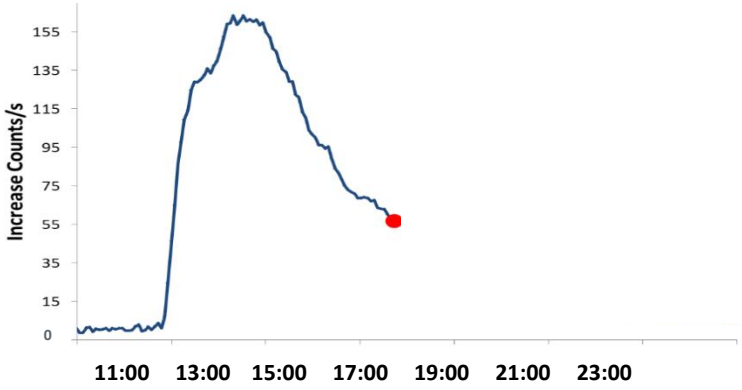

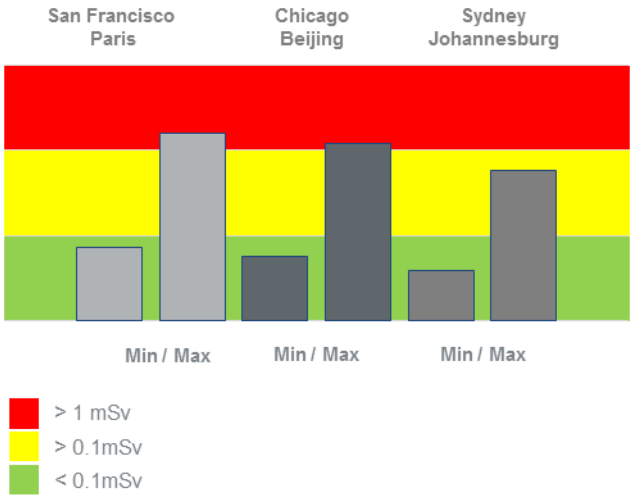

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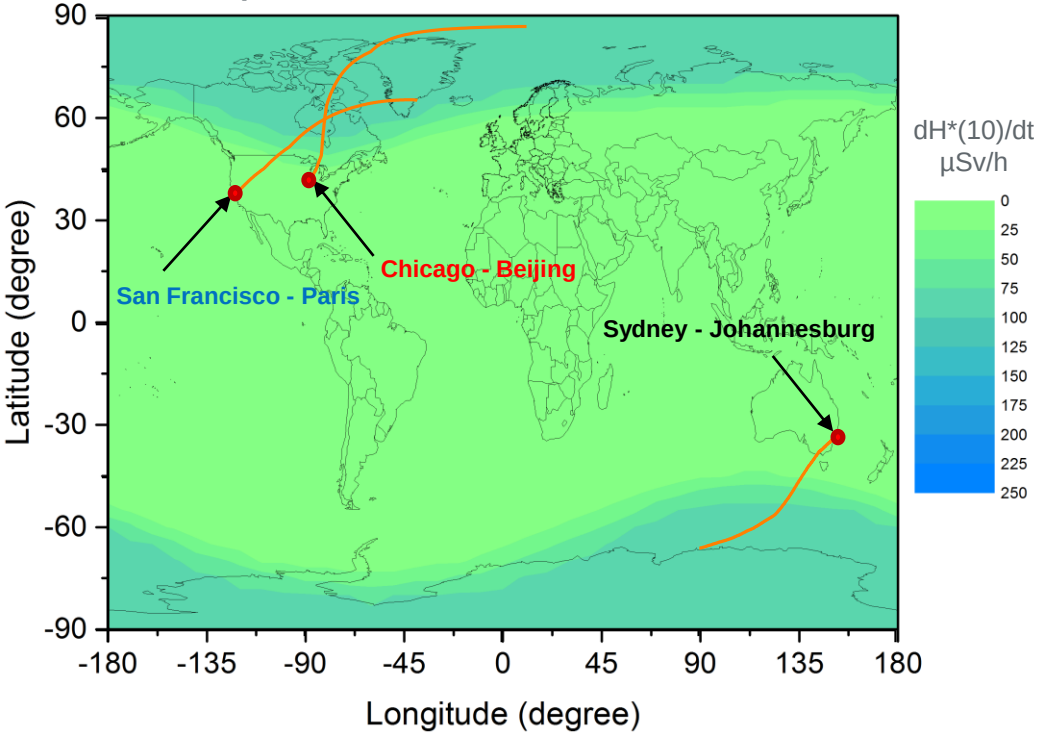

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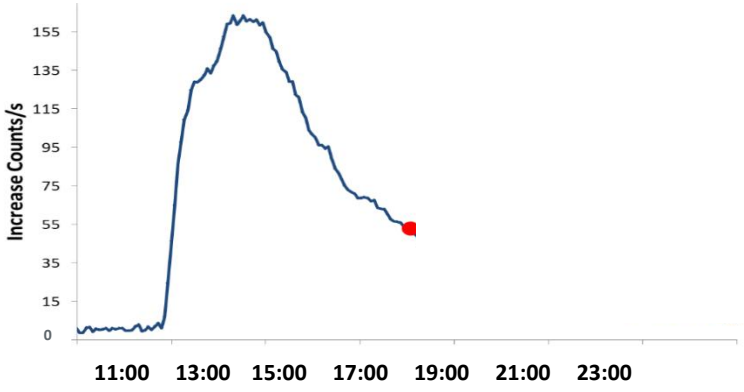

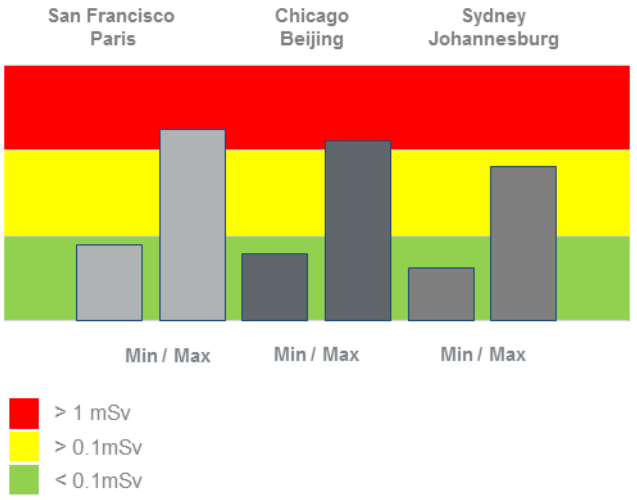

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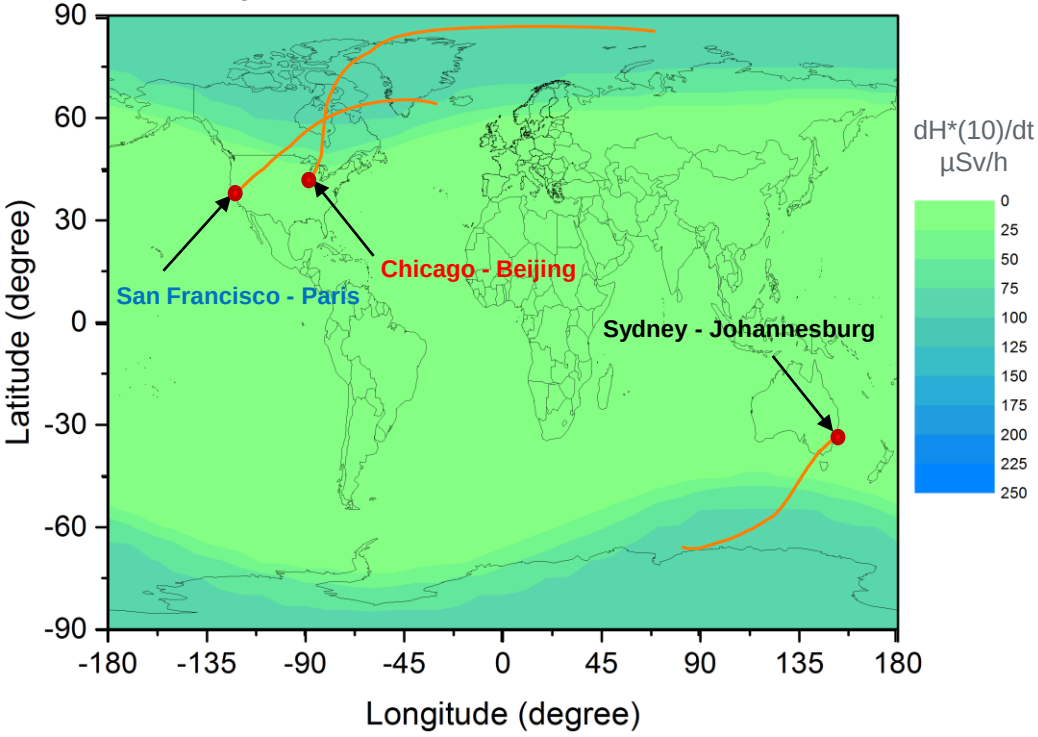

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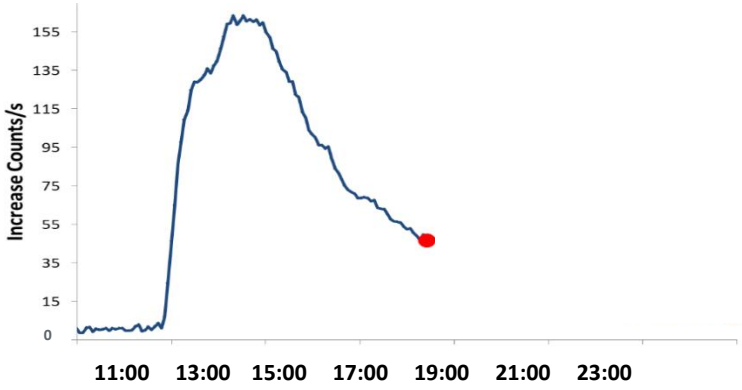

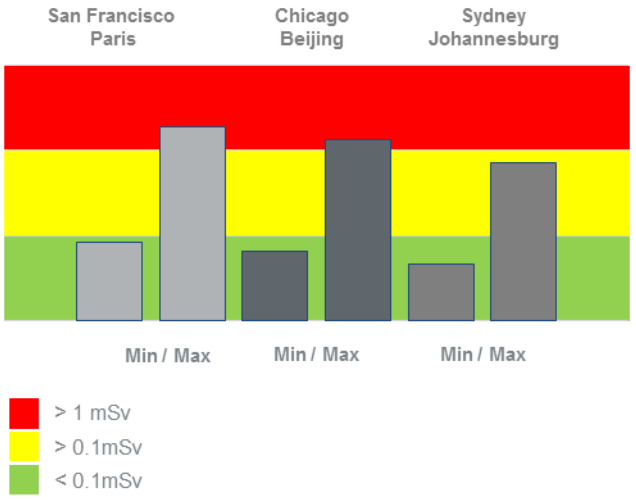

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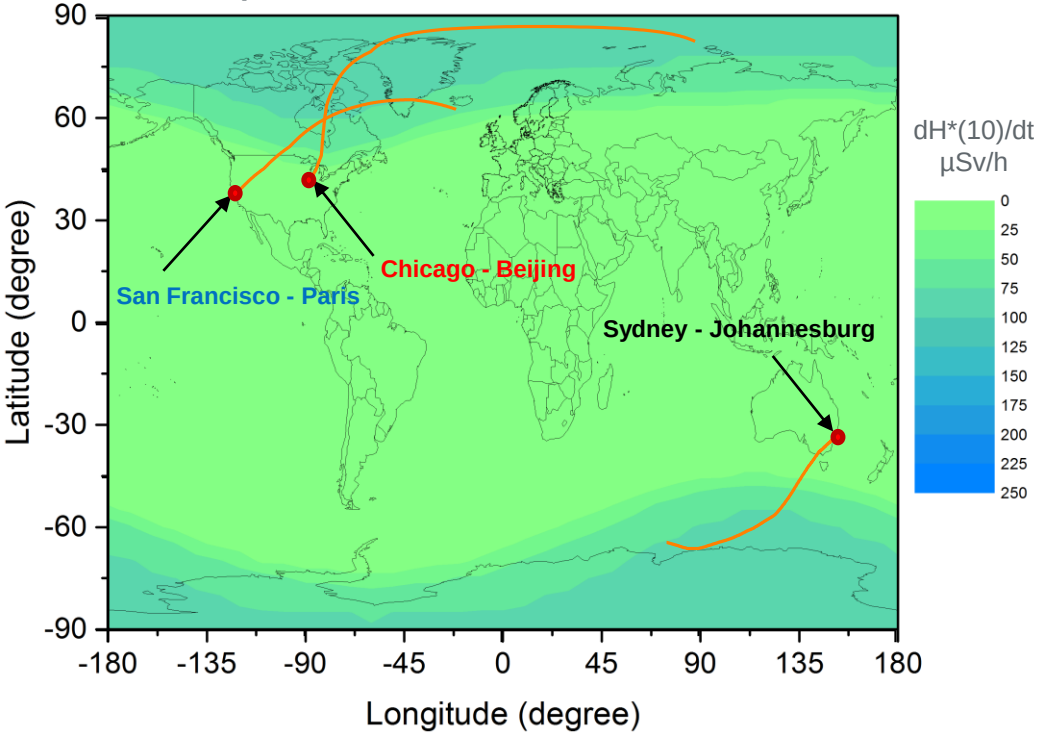

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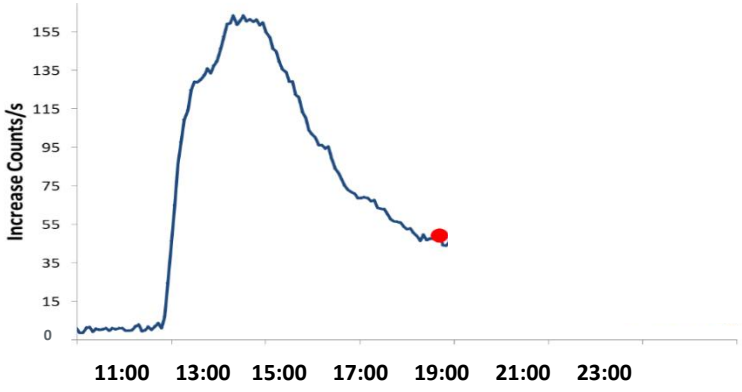

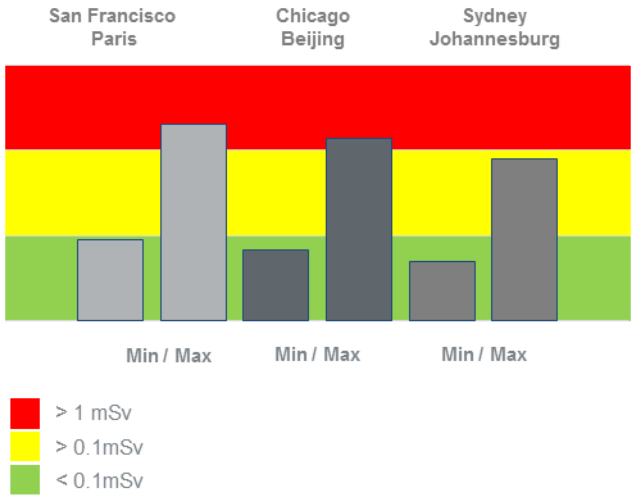

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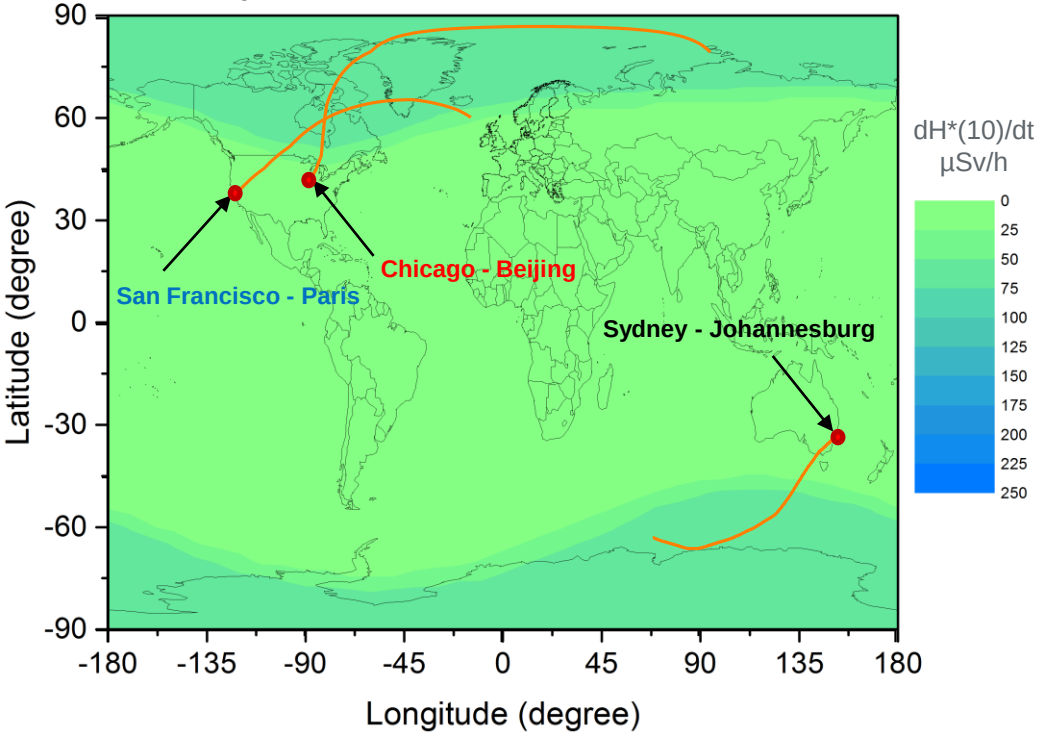

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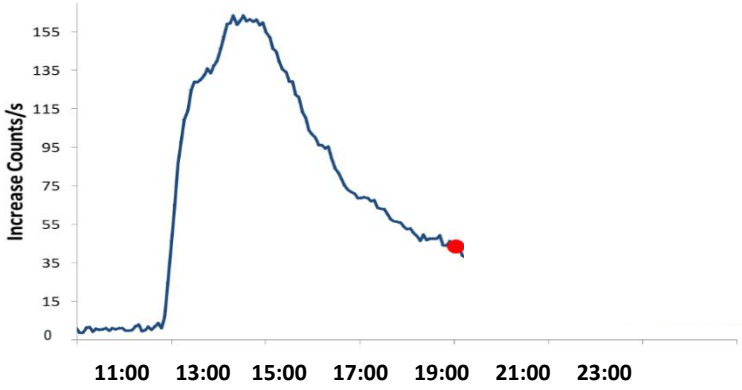

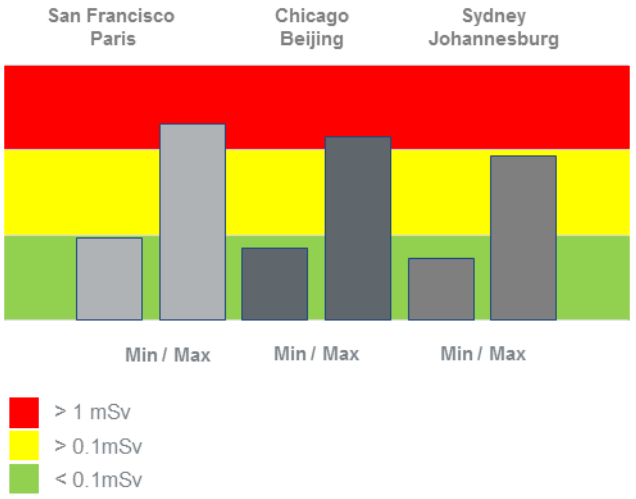

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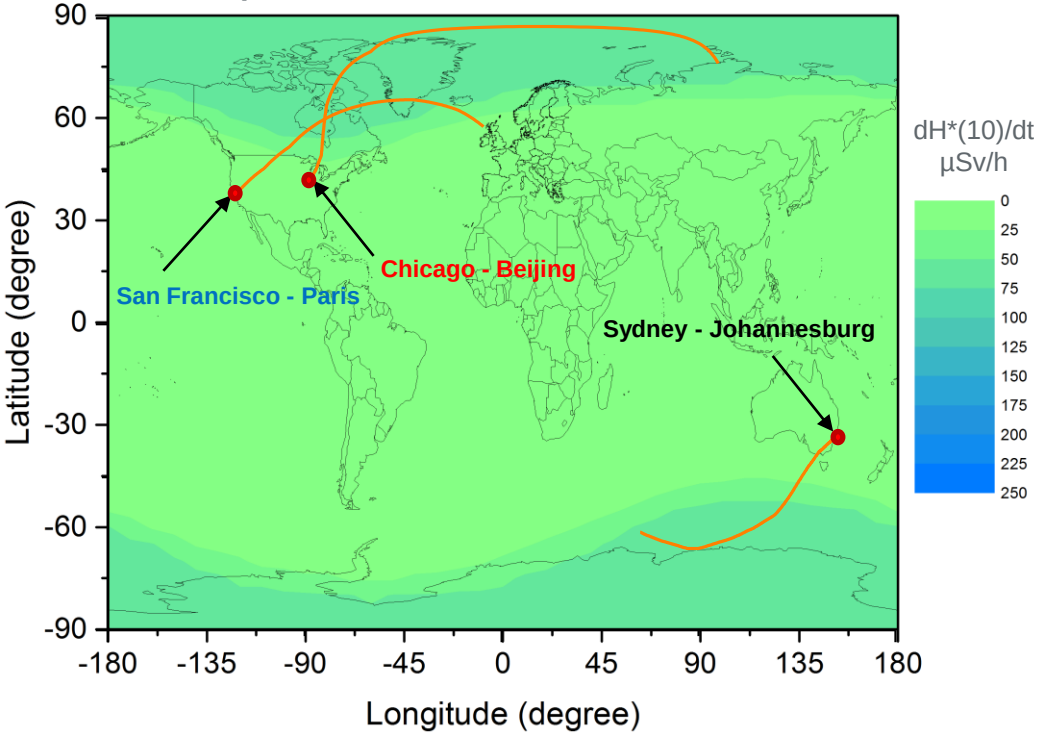

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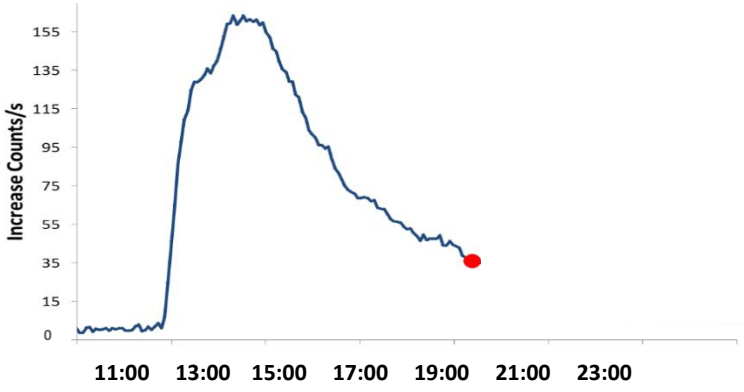

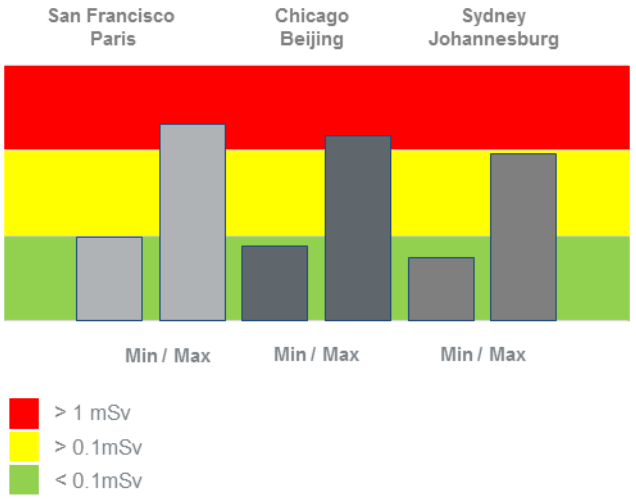

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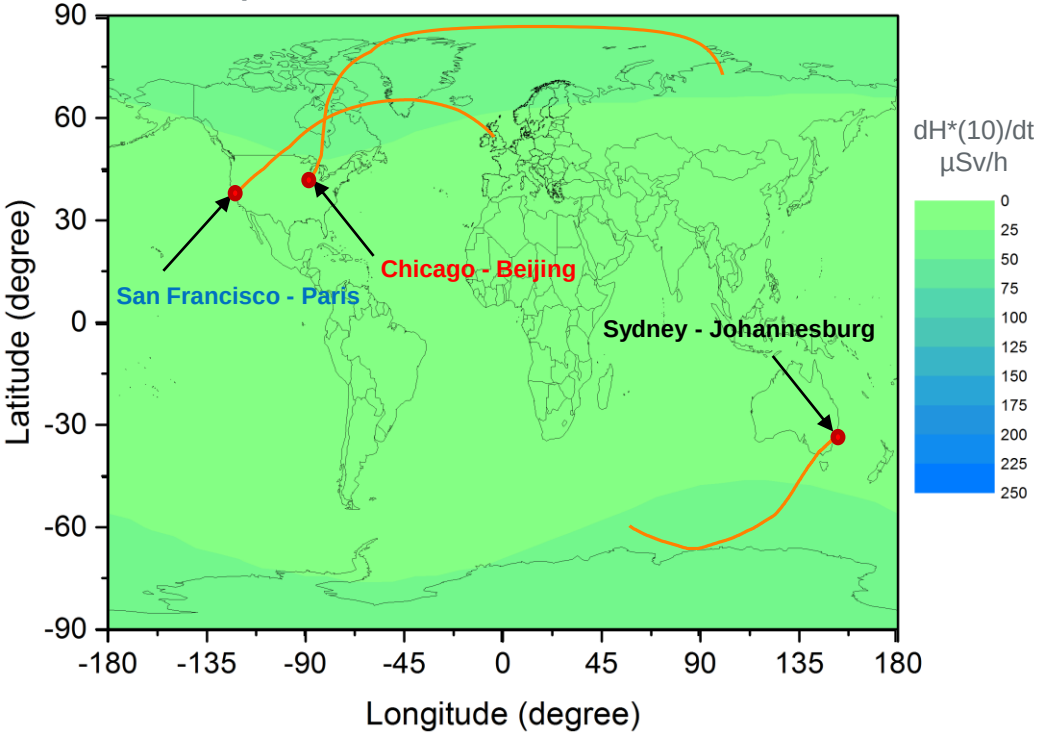

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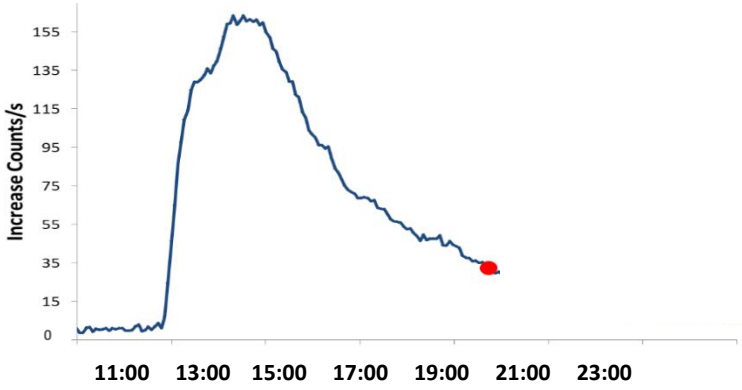

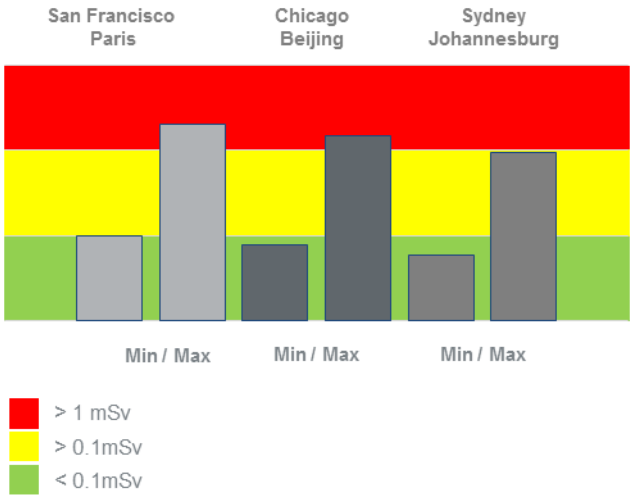

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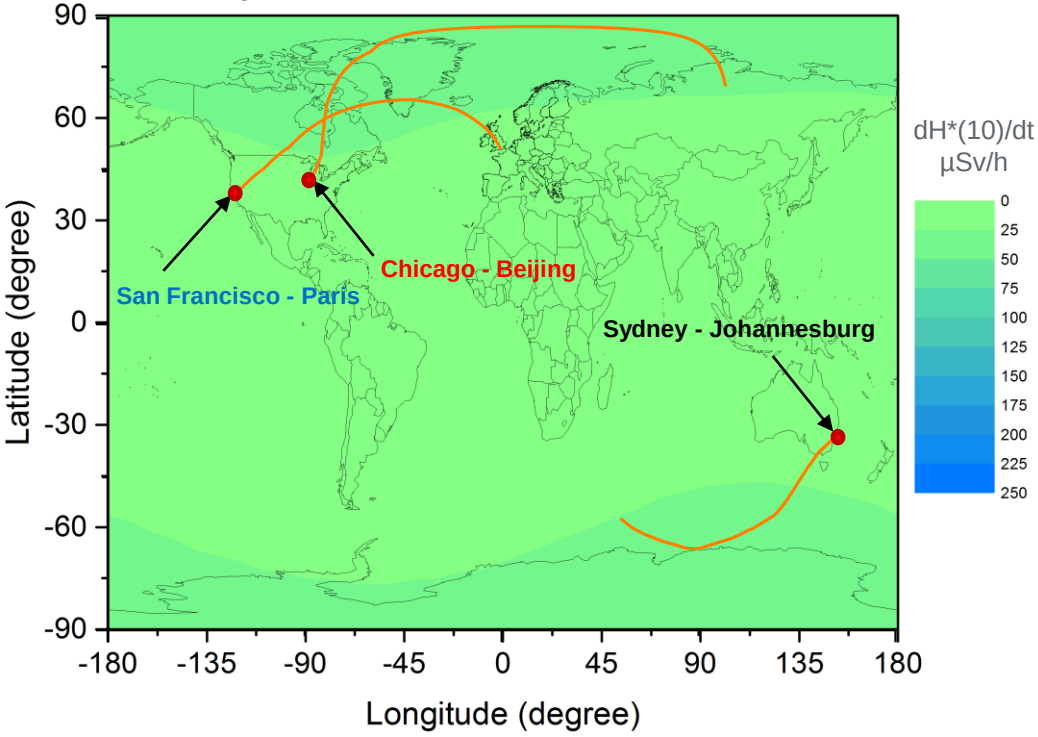

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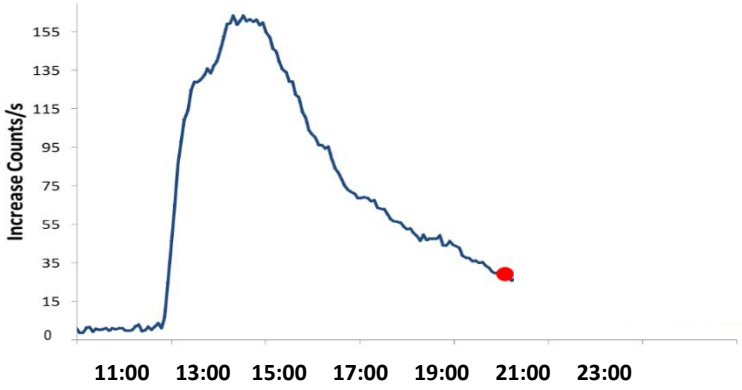

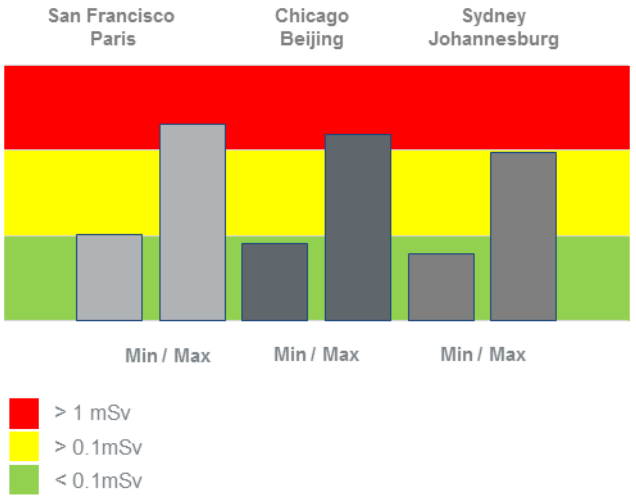

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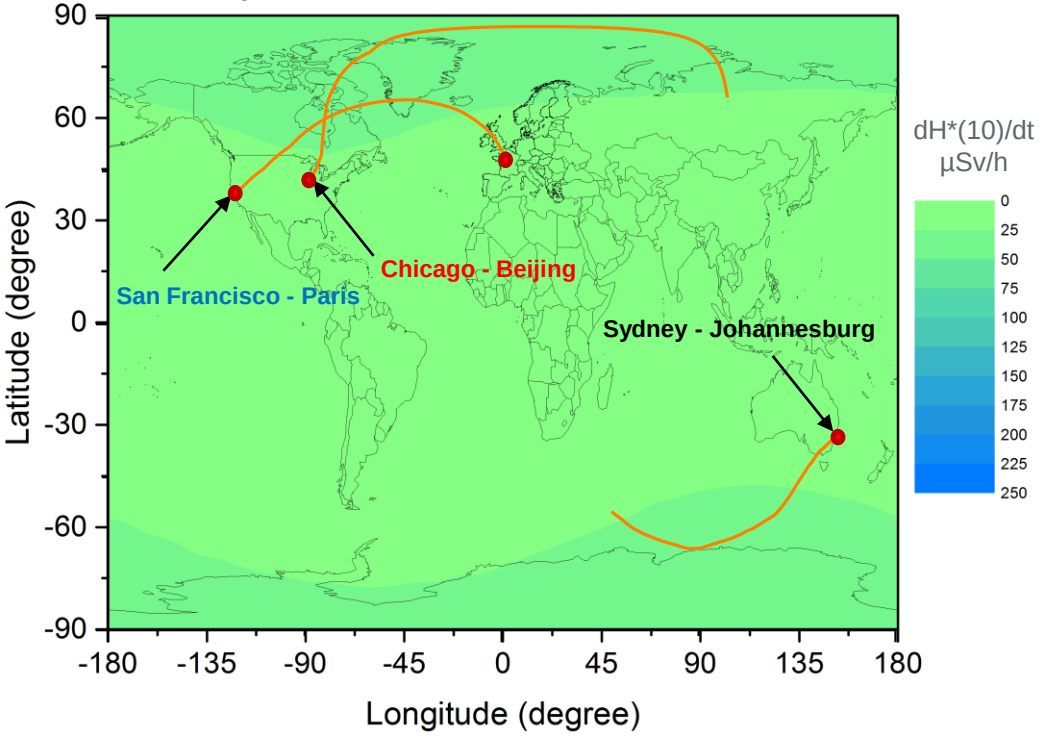

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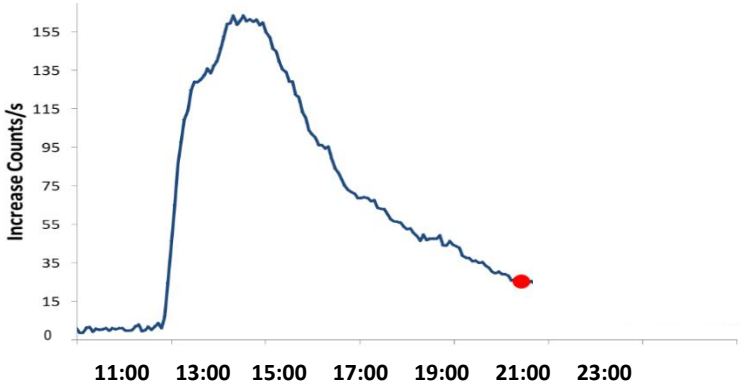

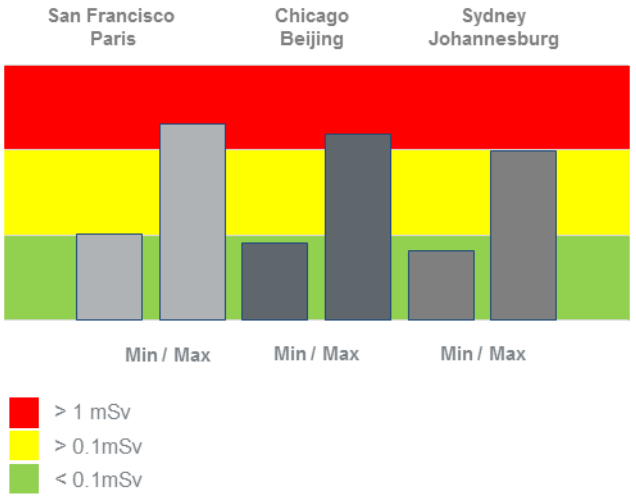

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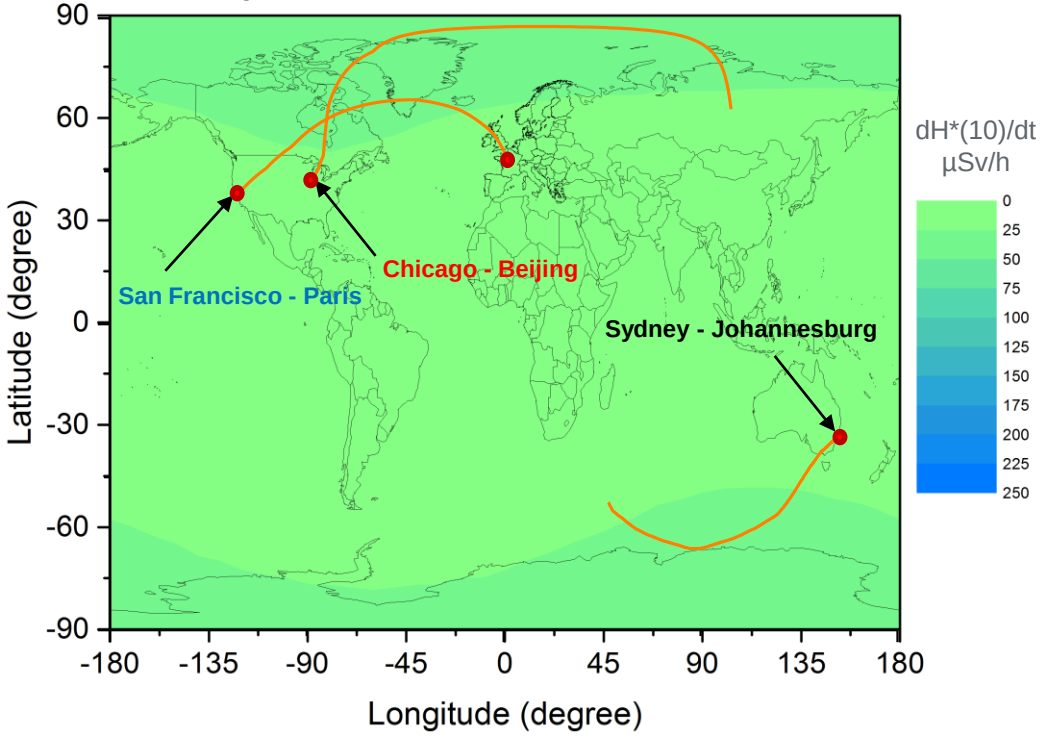

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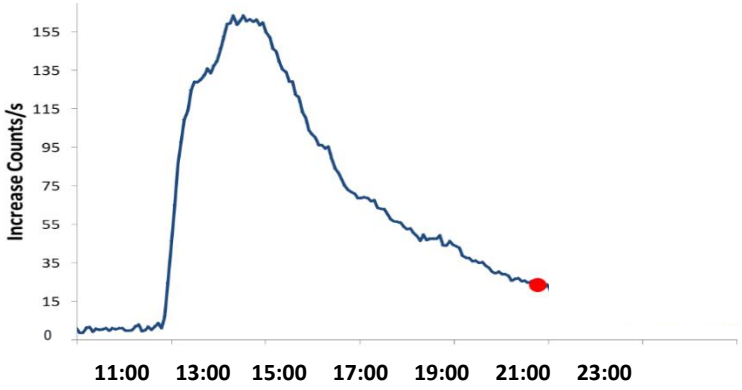

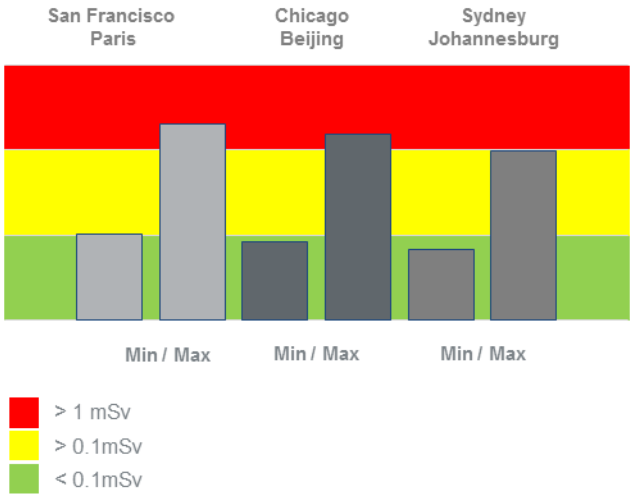

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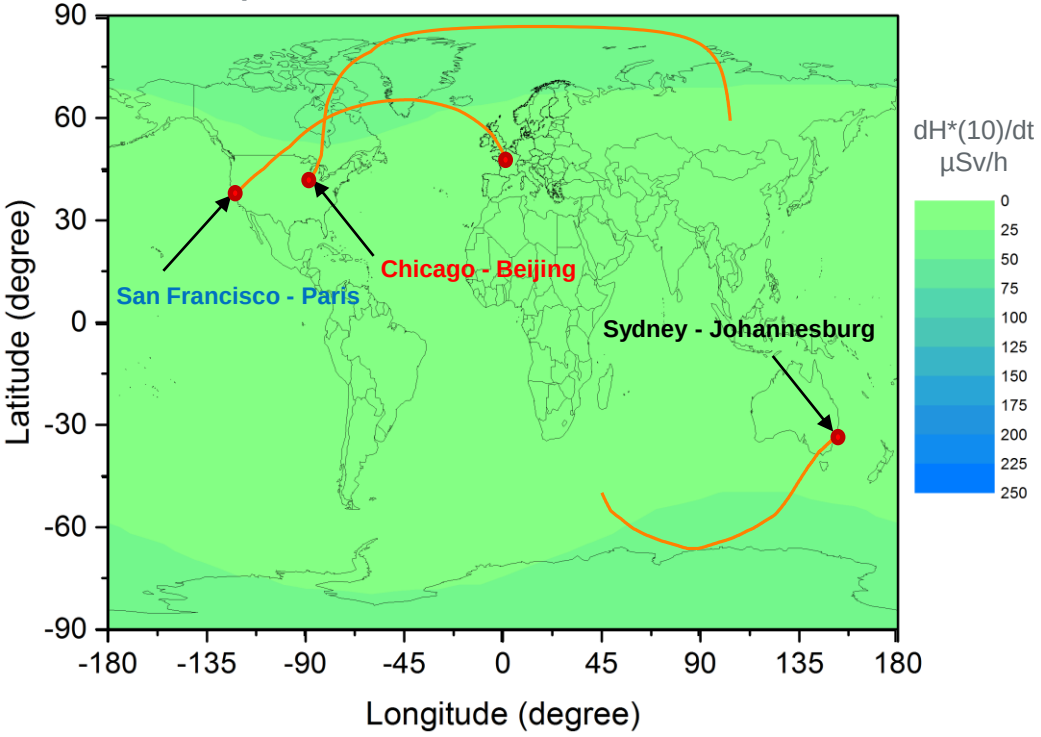

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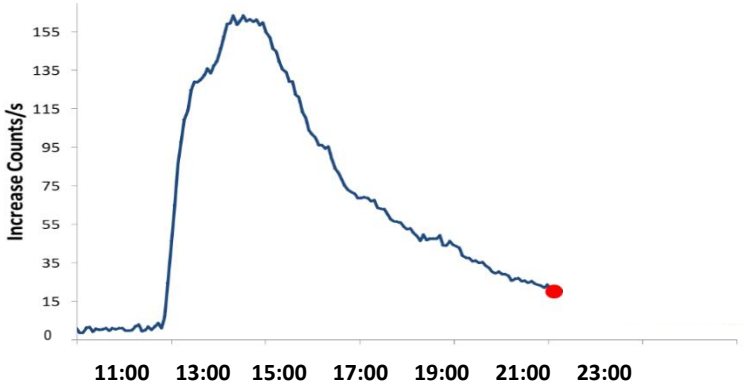

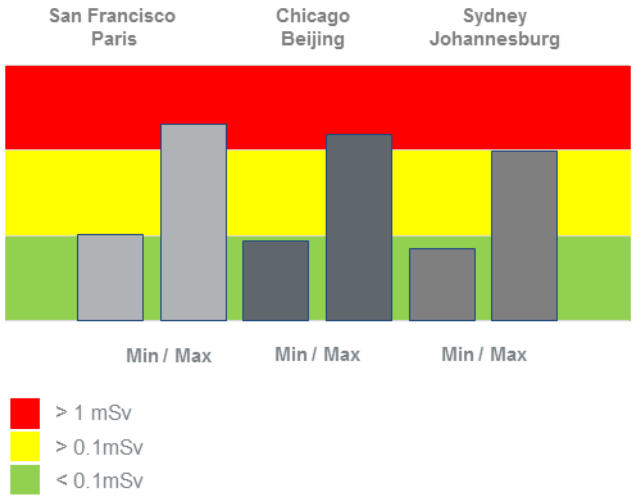

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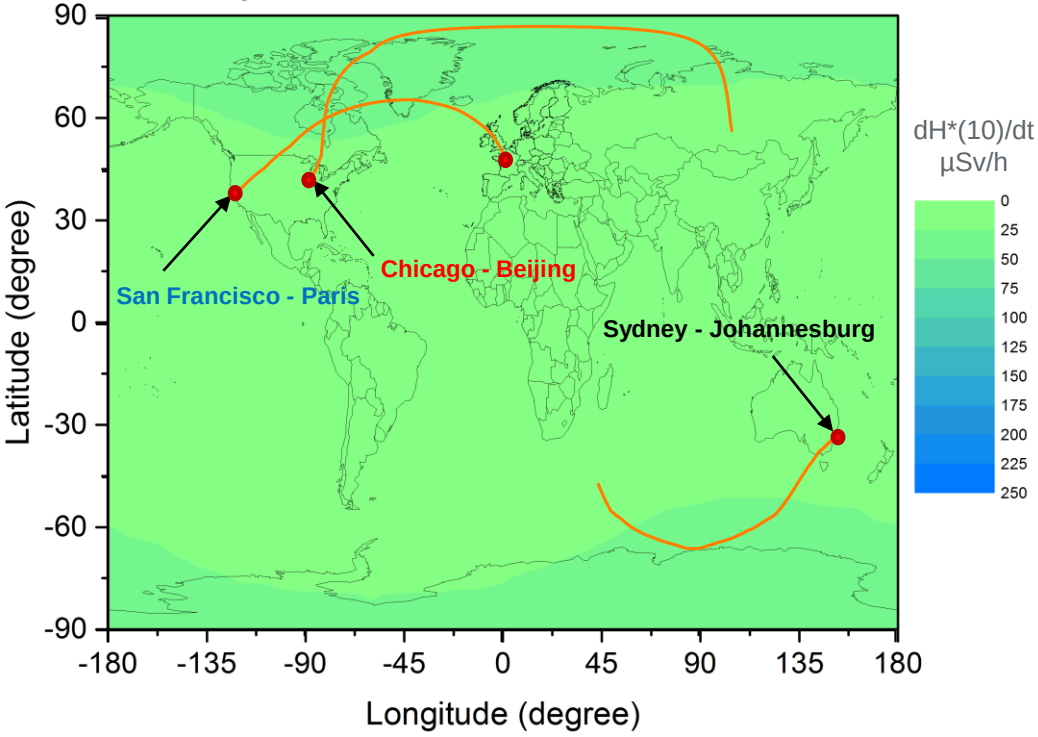

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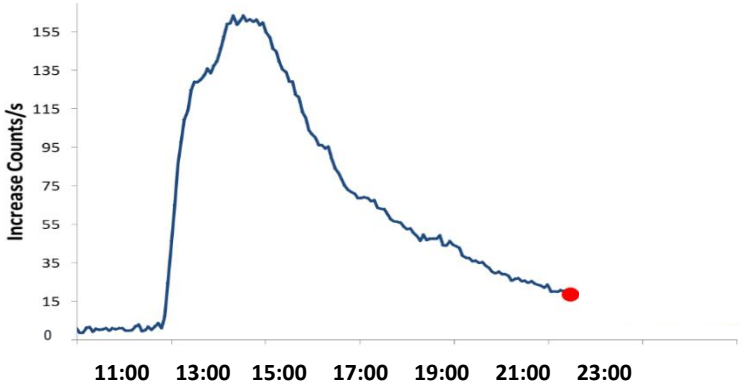

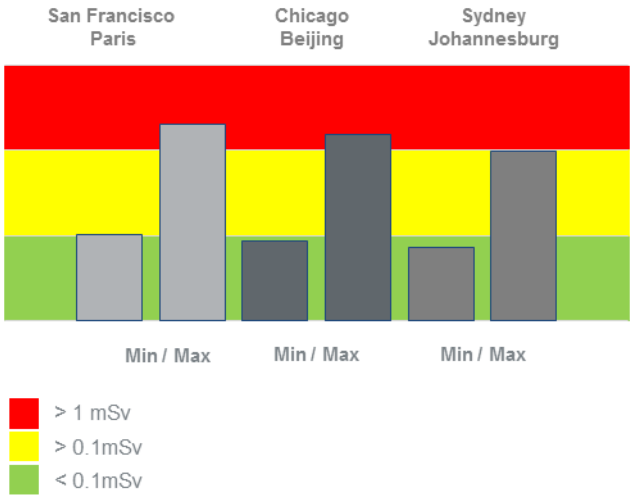

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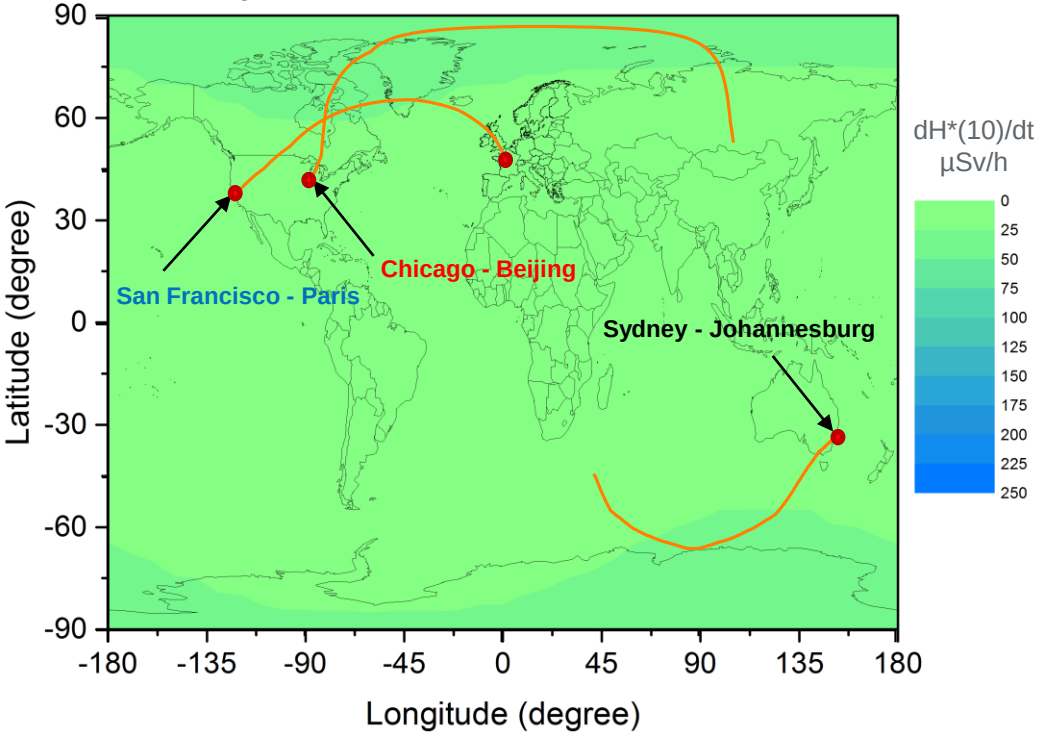

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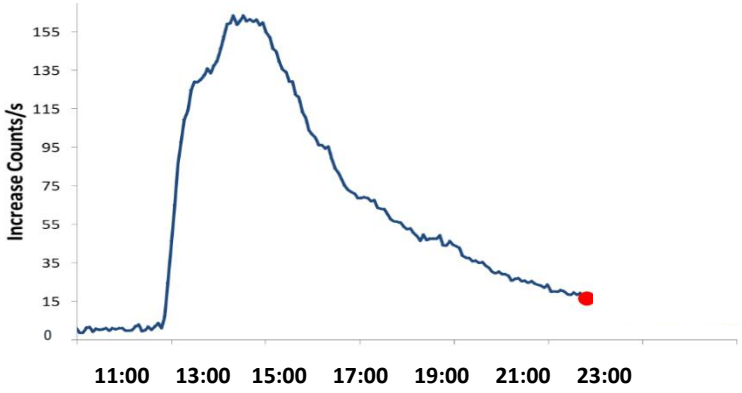

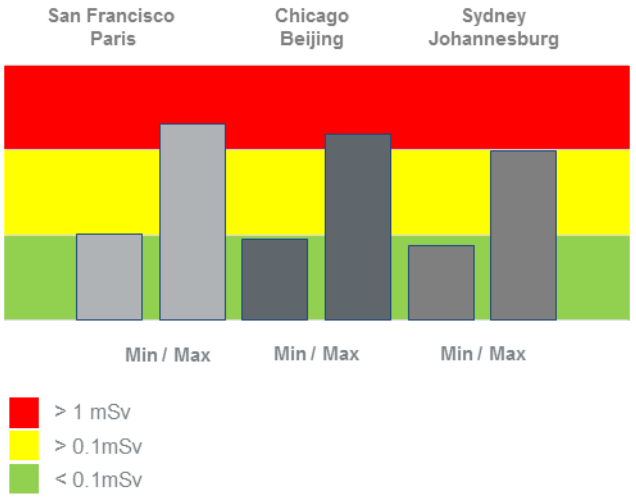

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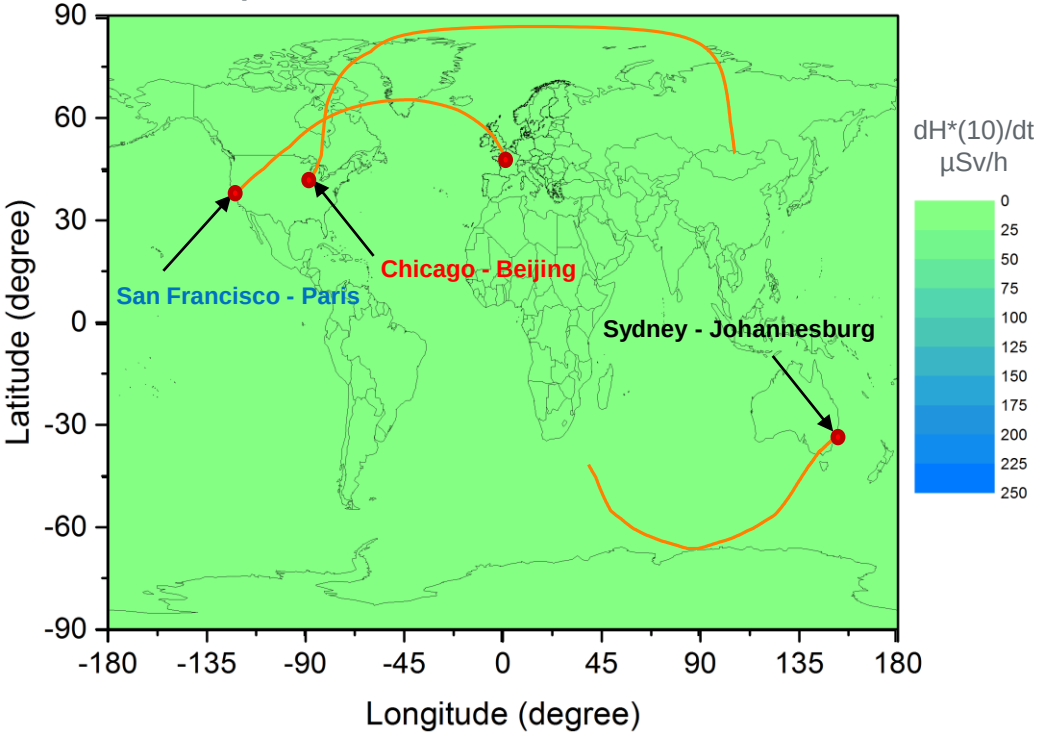

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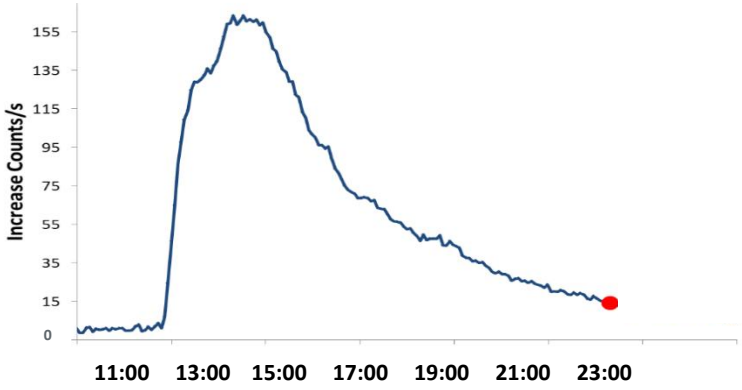

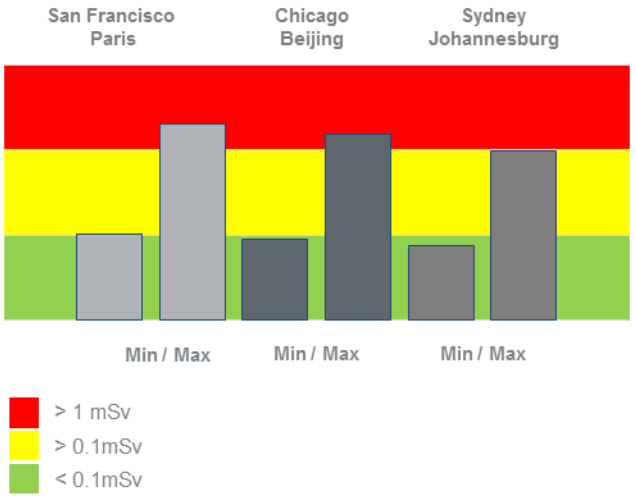

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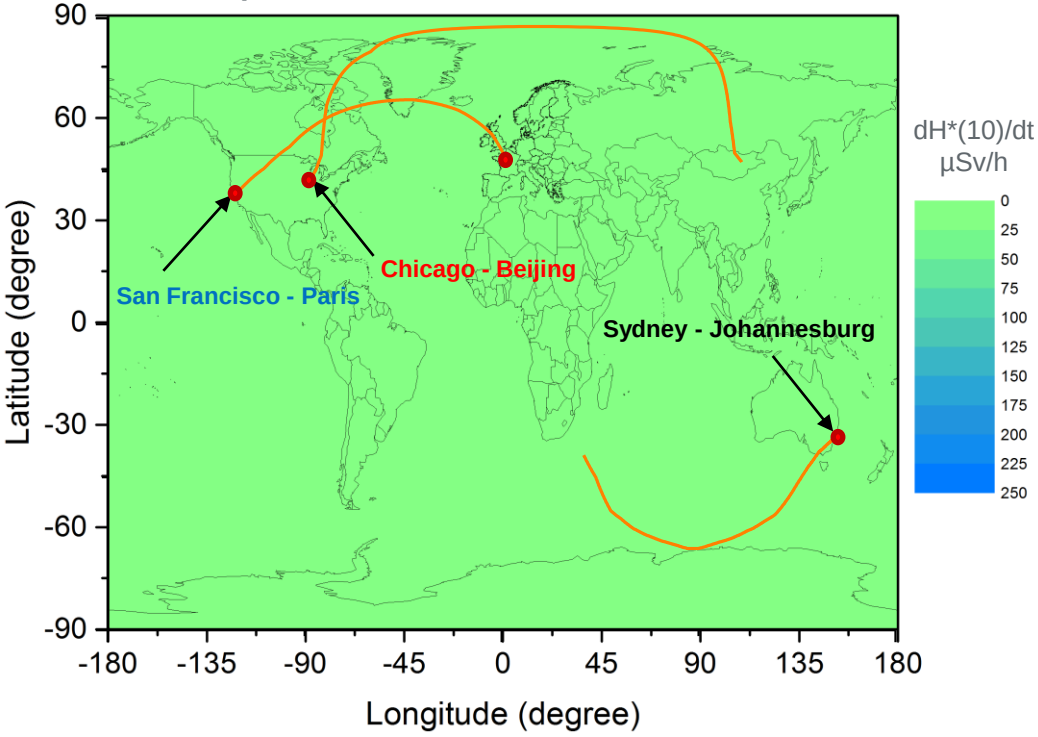

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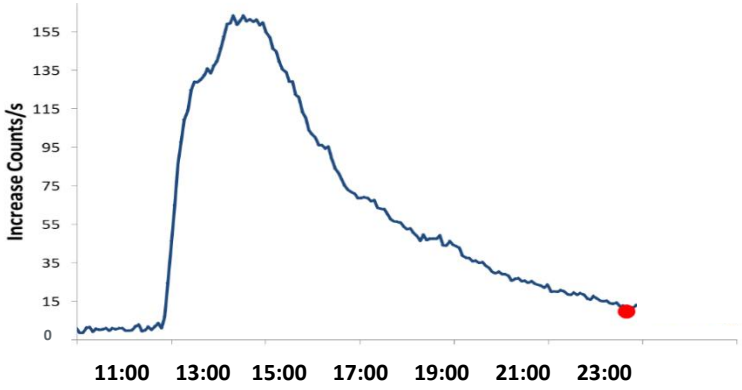

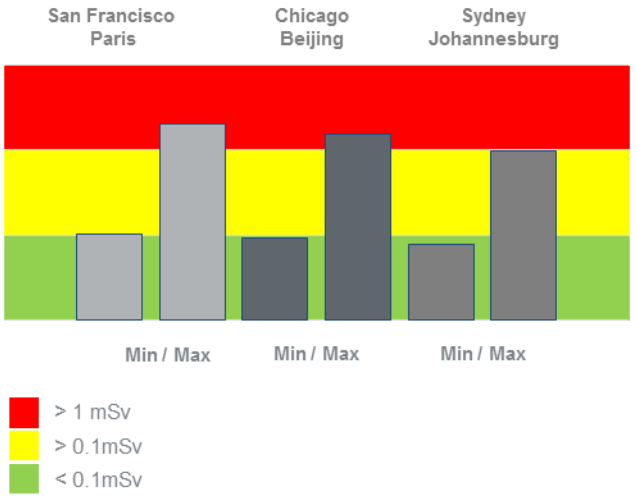

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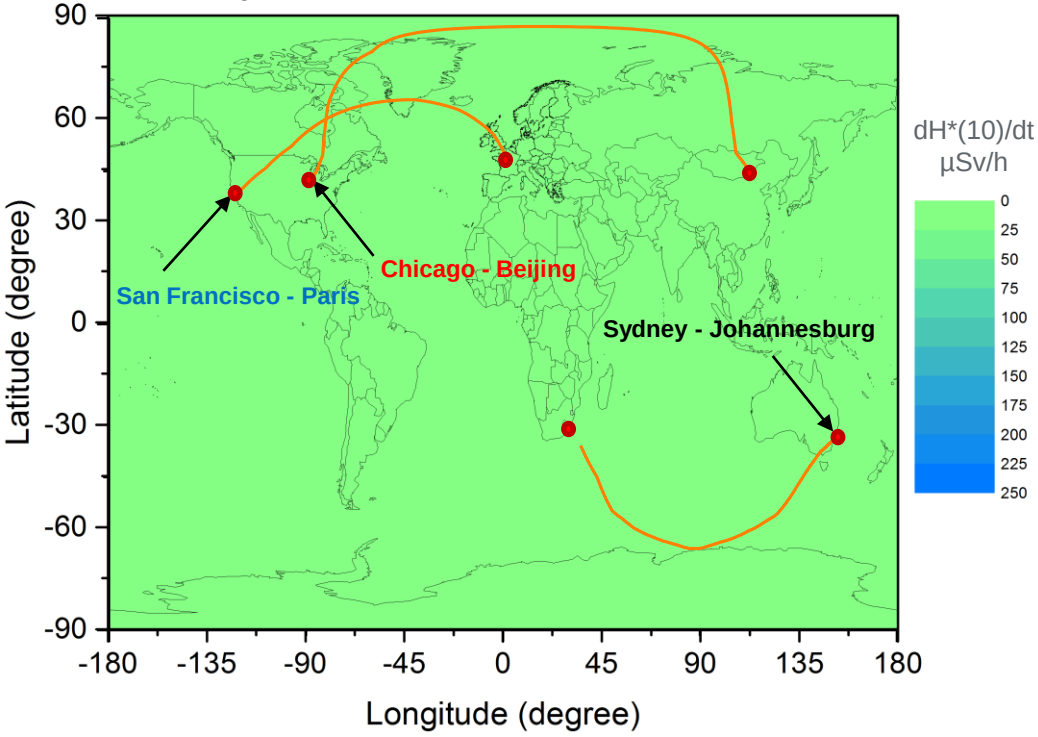

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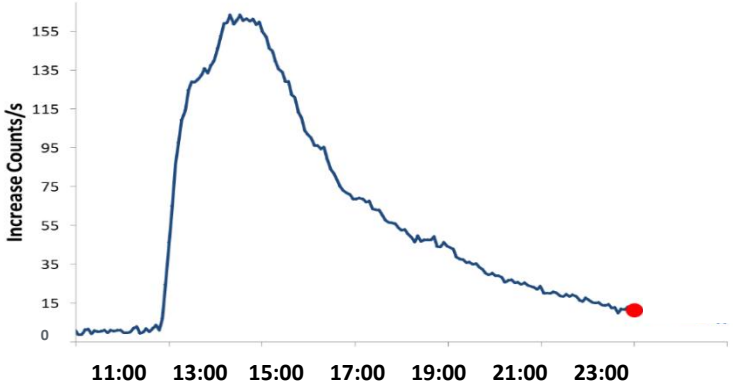
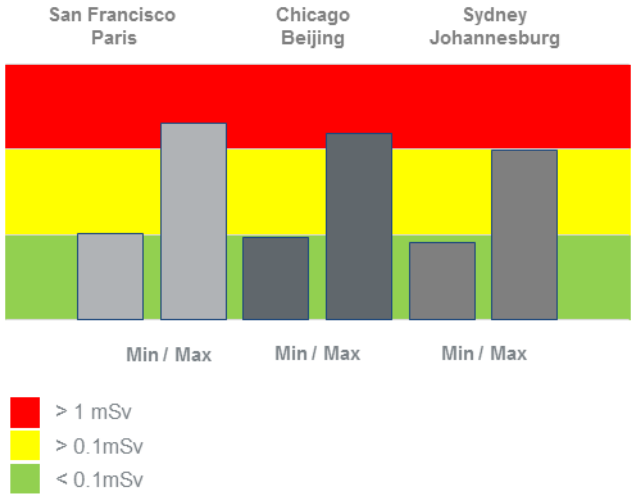
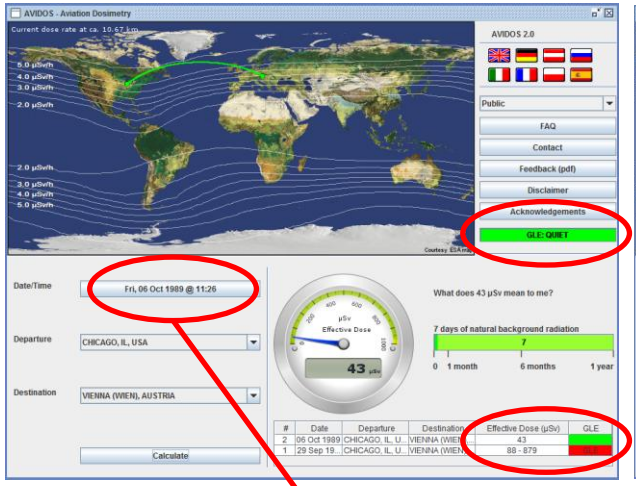


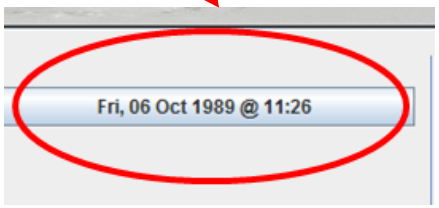


AVIDOS 2.0 at ESA's Space Weather Portal

AVIDOS 2.0 at ESA's Space Weather Portal

Public Mode





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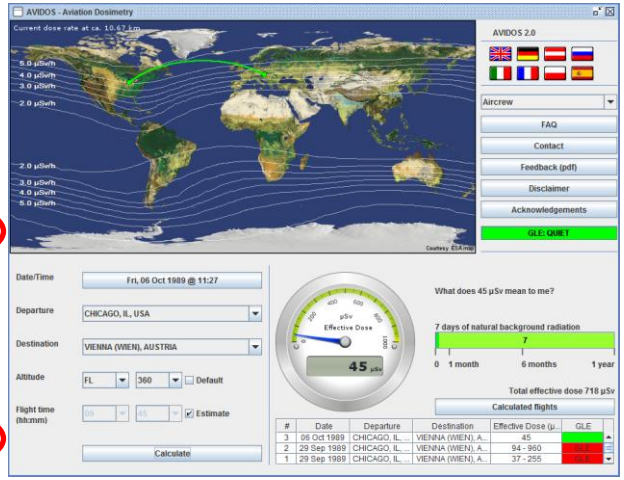
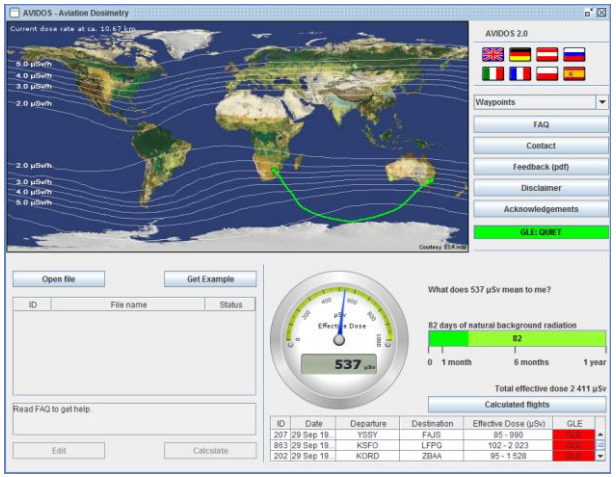


Waypoint Mode



Conclusions and Outlook

- AVIDOS 2.0 provides real time assessment radiation exposure at flight altitudes due to solar energetic particles based on one neutron monitor
- AVIDOS 2.0 online 2015
- AVIDOS 1.6: http://swe.ssa.esa.int/web/guest/avidos-federated

- >1 neutron monitor
- User's proton input spectrum
- Implementation of historical GLEs

Thank you for your attention!