

# Commission G Report

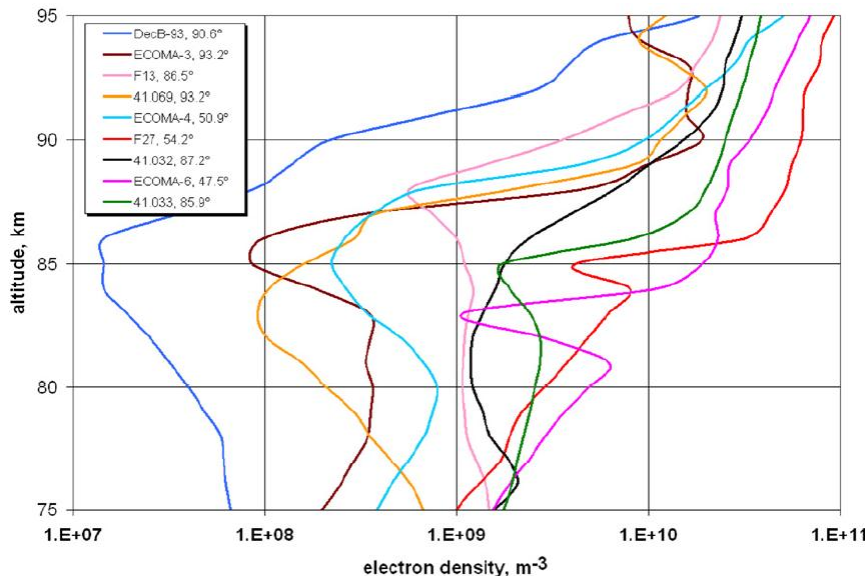
Klaus Torkar  
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IWF, 12 December 2011

**Main activity:** Faraday rotation experiments on sounding rockets, in combination with ion probes (TUG) and experiments by other campaign participants: Langmuir probes, mass spectrometers, dust detectors, and ground based experiments (radars)

**Main goals** are studies of the high-latitude mesosphere, in particular:

- Influence of aerosols or meteoric smoke particles on plasma balance
- Polar Mesospheric Summer Echoes, Noctilucent Clouds
- Sporadic E-layers, Electron depletions (bite-outs)

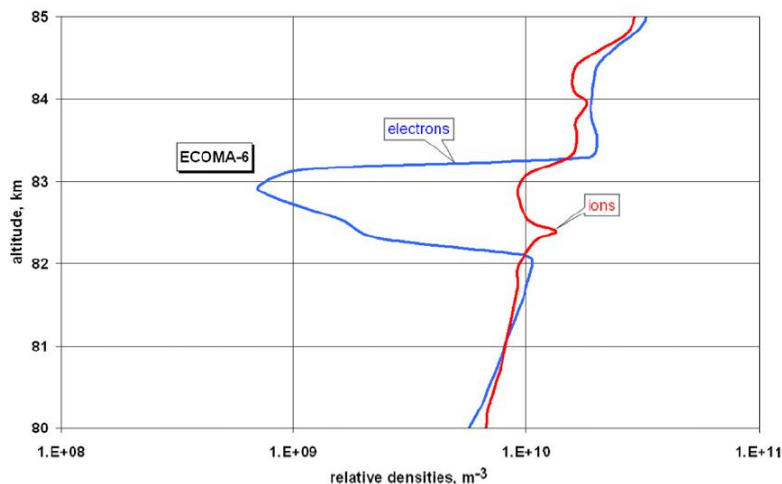


Summer electron density profiles from high latitudes measured by Faraday technique, showing bite-outs (Friedrich et al., JASTP 73, 2011, 2201–2221)

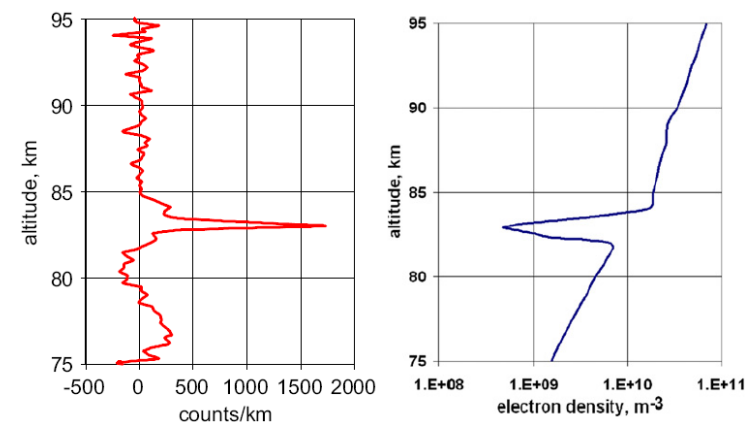
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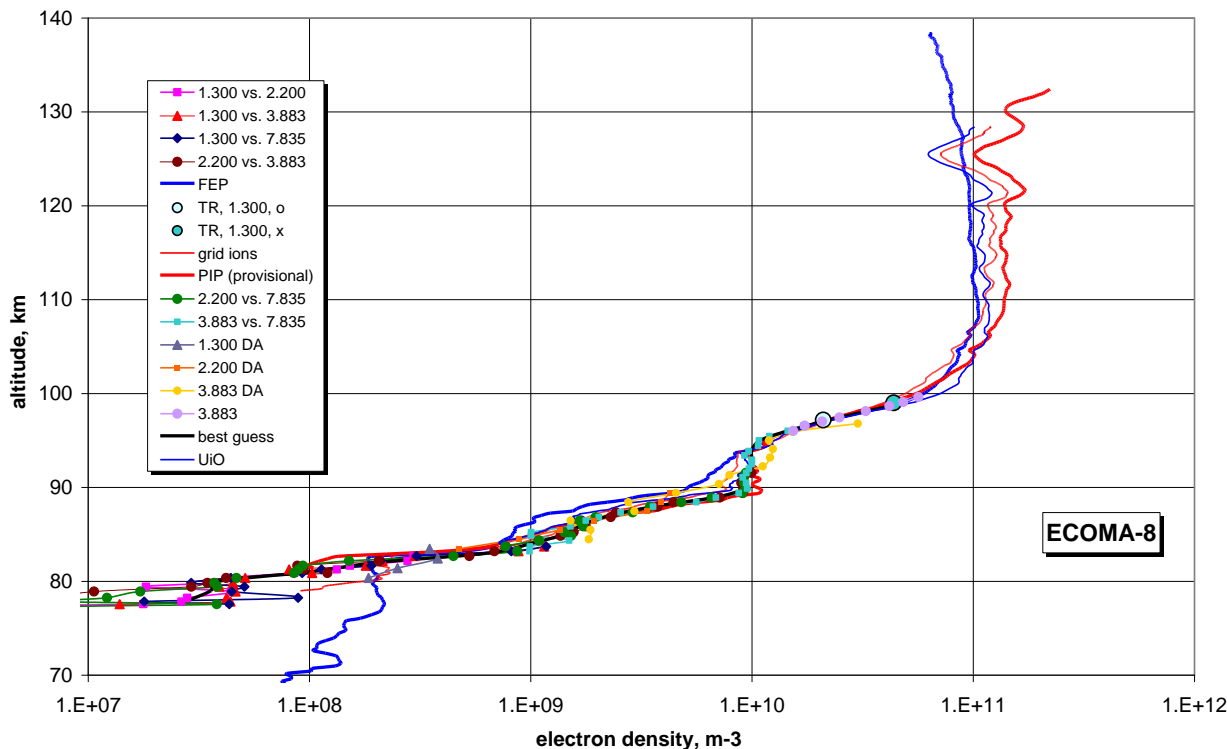


Blow-up of electron bite-out



Derivative of scattered light intensity

- ECOMA (Existence and Charge State of Meteoric Dust Grains in the Middle Atmosphere): 3 payloads, Dec 2010–Jan 2011, Andøya
- PHOCUS (Particle, Hydrogen and Oxygen Chemistry in the Upper Summer mesosphere): one payload, 21 July 2011, ESRANGE
- CHAMPS (Charge and mass of meteoritic smoke particles): Two payloads, 11&13 Oct 2011, Andøya rocket range



Plasma density profiles from ECOMA-8, showing interplay of Faraday rotation, differential absorption, and probe data

- Study on bite-outs and other depletions of mesospheric electrons
  - JASTP, 2011
- Ecoma workshop, Stockholm, 7 November 2011
  - Presentation of ECOMA Faraday and probe results
- 19<sup>th</sup> ESA-PAC Symposium, Bad Reichenhall, June, 2009
  - In situ observations of a dying sporadic E-layer
- 20<sup>th</sup> ESA Symposium on European Rocket and Balloon Programmes and Related Research, Hyère, France, May 2011
  - Charge balance in the presence of meteoric smoke in the upper mesosphere under Winter conditions
  - Electron loss and meteoric dust in the mesosphere
- 19<sup>th</sup> ESA-PAC Symposium, Bad Reichenhall, June, 2009
  - In situ observations of a dying sporadic E-layer
- Signatures of mesospheric particles in ionospheric data
  - Ann. Geophys., 2009

## Continuation of Faraday rotation experiments to participate in studies of the mesosphere

- WADIS ( WellenAusbreitung und DISSipation in der Mittleren Atmosphäre: Energiebudget und Spurenstoffverteilung / wave propagation and dissipation in the middle atmosphere: energy budget and distribution of trace constituents.)
  - Successor campaign of CHAMPS, launch planned in 2013, Andøya