

GCI M/LT Workshop Essen - Minutes

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18.06.2019 GCI M/LT Workshop Essen - Minutes

Tuesday 18. June 2019

19:02

Content of the project (Kolbjørn Blix)

- Still open to all launch sites, observatories etc.
- Information on the process from GCI-Cusp
 - Determining ground-based systems related to the rockets
 - Grouping the rockets in time and launch site
 - 2020: organizational chart
 - Science topics and platforms have been identified at a meeting at Goddard in May

Science topics in the mesosphere (Lübken)

- Optimise scientific questions and observations to be made so that we look for what can't be measured better by ground-based or satellites.
 - Ground-based (lidar, radar, airglow): technology improving, to measure 4D-structures, from ground to lower thermosphere. Already information available. Techniques have been replaced by lidar. Airglow; Mike Taylor (AMTM).
 - Aircraft measurements: both in-situ and remote-sensing. December 2021 (Rapp, campaign in northern Scandinavia). Combination of instrumentation to increase value
 - Satellites: improved earth observation satellites
- Possible topics:
 - Dynamics, transition from larger to smaller scales. 4D and continuous measurements.
 - Turbulent transport and eddy diffusion (relationship between them)
 - Relationship between small-scale fluctuations and "mean" - models assume small-scale variations as negligible.
 - Impact of gravity waves on the background atmosphere
 - Plasma dynamics, instabilities, mean state
 - Composition - trace gases. Atomic oxygen!
 - Ice particles - composition, charged?
 - Dust particles - composition, charged?
 - Tidal structures (seems independent of the sun, Antarctica, Fe)
 - PMWE, PMSE - monitoring turbulence by investigating PMWE
 - Atmospheric coupling (thermosphere and troposphere). Thermosphere coupling can cause destruction of Ozone
 - Effective transport mechanism of turbulence (heat, momentum...)
- Use of developed technology to study topics otherwise unavailable. GCI for this region is important to enable new projects and aid in funding.
- Document for science questions and how GCI solves these questions, role of sounding rockets in this work

Doug Rowland (Nasa, Goddard)

- Ionosphere, thermosphere, mesosphere group at Goddard
- Underfunded area of research in the US - mostly focused on ionosphere and thermosphere
- Beneficial with a larger group, using different techniques (balloons and aircrafts, ground-based) to increase the value from each rocket
- Turbulence as a central pillar in the project, like magnetic reconnection have been in the cusp-project
- Goddard has no mesospheric rocket capabilities, but working on building it

- Already funded projects to use as nuclei for the rest of the project

Markus Rapp, DLR

- Airborne campaign in Scandinavia 2021 (Arctic, home base in Kiruna?), funded and not possible to move around
 - Lidar capabilities to measure up to 110 km
- Open for combination with ground based, and possibly sounding rocket missions (gravity wave dynamics, wave dissipation)
- Continuation of the MacWAVE initiative from early 2000's

Ingrid Mann, UiT

- Mesospheric dust from sounding rockets. New miniaturized instrument - SPID
- Norwegian funding scheme "Følgemidler" reduced to a level where funding of MaxiDusty-2 is not possible. Infrastructure application to Norwegian Research Council possible way forward.
- Sample return with recovery, modified dust-detectors from G-Chaser (SPID test)
- Preparation in research project
- 2022: overlap with Eiscat 3D (operational by the end of 2021)
- Optical group at UiT - trace gas detection

Boris Strelnikov, IAP

- Experience in campaigns
- Additional information from MAARSY, ALOMAR ++, experience in combined campaigns
- WADIS showed the benefit of the collocation, but also that some information is "missing", additional rockets and instruments needed for complete image of turbulence
- Requires 4D-image of the dynamics to understand the sounding rocket data
- Turb3D - same as the 4D-space concept?
- Not the required resolution from lidar observations - validation of wind measurements with different techniques
- Use of falling spheres still important

DLR, Felix Huber

- Horizontal rocket flight; gel propellant, throttle, 100 km hovering horizontal (theoretically possible to land it in Kiruna)
- Test flight in 2020 or 2021 (Andøya towards sea before landing in Kiruna)
- Gel propellant vibration-less
- Attitude control more difficult with liquid or hybrid

Jörg Gumbel, Stockholm University, and Royal institute

- Interested in participation in the MLT-initiative
- Optical techniques (photometers), looking at any kind of emissions (auroral, night-time...)
- Side-looking NLC photometer with telescopic baffle (used from Andøya)
- Tomography (MATS) as a complement to ground-based and rocket-borne
- Rocket planned with MATS: Oxygen and sodium nightglow mechanisms (John Plane, UK)
- Proposal from MacWave ca 2001
- Swedish rockets politically obliged to launch from Kiruna. Possibility for launches from both sites to obtain 4D-measurements, also with ground based instrumentation at both sites

Jøran Moen, UiO

- Middle atmosphere - existing cooperation with Germany after FFI ended their activities
- Take advantage of the ground-based capabilities at Andøya
- Strengthen the ESAPAC-collaboration, with JAXA and NASA in addition
- White paper for the project science topics and how to solve them (Franz-Josef)
- Norwegian activity needs a bigger umbrella to survive, single rocket campaigns are no longer possible to fund
- Key instruments on several rockets, to calibrate missions against each other and make it easier to

compare

- Funding competition in Norway with all fields of science, not only natural sciences
- UiO: Charged particles and plasma dynamics in the mesosphere and lower thermosphere
- Using the DLR flight campaign to start a "mini"-challenge

Kolbjørn Blix, closing remarks

- AGU Fall meeting and EGU as regular meeting points, but like with the ongoing GCI CUSP we'll always try to be represented at CEDAR too. Next meeting will take place at AGU Fall Meeting 2019 in SF. Date and time will be issued later.
- US funding opportunities in September. Demands immediately start-up on the GCI M/LT Science White Paper
- German lead on the white paper to prepare as soon as possible, but US and others must help (Gerald Lemacher/Miguel Larsen? - Kolbjørn will ask)
- Mailing list will be updated with names from attendees etc

Doug Rowland, NASA Goddard

- Time-chart with all proposed (funded or not) to coordinate all projects as an appendix to the white paper, and illustrate the possibility to build campaigns around already existing initiatives. Sent around with minutes from today's meeting

Opprettet med Microsoft OneNote 2016.