

CAWSES Working Group Panel Theme 3 – plans in Norway



Ulf-Peter Hoppe,
Norwegian Defence
Research
Establishment (FFI)
and Tromsø University
22 July 2004



Hunten's smoke particles – do they exist?

- ECOMA Program (**E**xistence and **C**harge State of **M**eteoritic Dust in the **M**iddle **A**tmosphere) 2005-2008
- Multi-year rocket and ground-based program with several campaigns planned from Andøya Rocket Range, 2006 - ...
- German-Norwegian Collaboration. PI: Markus Rapp, IAP Kühlungsborn, Norwegian Co-I: Tom A. Blix, FFI
- Collaboration with other partners (rocket instruments and ground-based) welcome! (e.g. TURMALIN 2006?, MASS 2007?)
- Prove the existence of smoke particles and establish their size and charge distribution, **or**
- Disprove the existence of smoke particles and come up with ideas why they do not
- (We believe they do exist, not only as a sink for meteor particles, but as important condensation nuclei for PMSE particles and NLC particles "Icy Particles")

PMSE particles and NLC particles

- NLC have been observed almost unchanged for 120 years, a strong indication of unchanged temperatures near 82 km at high latitudes in summer (Lübken, 2001)
 - Increasing atmospheric CO₂ have led to an observed decrease of temperatures in the upper middle atmosphere at other latitudes, as would be expected
 - Which physical or chemical processes stabilise the 82-km temperatures at **high latitudes** in summer?
- Further study of the electric characteristics of PMSE particles and their influence on radar echoes
- Identification of the processes that lead to long-lived small-scale structures in PMSE particles

Gravity Waves, Turbulence and the Energy Budget

- In collaboration with C.Y. She (CSU) and D.C. Fritts (CoRA), GW momentum flux will be studied with the ALOMAR Weber Na Lidar and other ALOMAR instruments, as well as the EISCAT radars.
- The importance of GW momentum flux divergence for the cold upper mesosphere at high latitudes in summer has been well recognised for many years, but detailed studies of the process have been elusive
- Turbulence is usually not isotropic and well-developed. We plan to study generalised turbulence with multi-probe instruments
- Energy Budget in the presence of particle precipitation and/or turbulence

CAWSES relationships with other international programmes



- CAWSES-related research in Norway can contribute to the **International Polar Year (IPY, 2007/2008)** as well, without a duplication of effort, but with broader results
- CAWSES-related research in Norway can contribute to the **International Living with a Star (ILWS)** programme as well, without a duplication of effort, but with broader results
- **What is the Panel's position on IPY and ILWS?**