SUMMARY of DISCUSSIONS in WG1: FOG and STRATUS:

Generally, there is a good understanding of processes,

BUT many difficulties due to localness and heterogeneity of fog occurrence => severe demand on models

MODELLING

- Important to separate modelling issue into different stages:
  - Formation
  - Vertical development
  - Dissipation
- More work needed on:
  - Parameterisation of the surface fluxes, which is crucial
  - Microphysics/aerosol processes and interactions with radiation
- New spectral theory for stable conditions developed & tested -> encouraging results -> to be tested in HIRLAM & WRF (USA) -> plans for validation with Sodankylä data
- Microphysics can be complex (many equations) but the lack of complexity is not an obstacle for good fog forecast.
- Two different topics: Operational models trying to forecast fog vs. special fog models
- For operational applications: one of main problem is in initialisation.
  In general not enough or not right type of data, especially soil moisture, liquid water & aerosols.
- 1-D models have the advection problem => 1-D models for very short range forecasting.
  Until explicit solution is available, statistical methods will be needed.
- Ensemble approach might be a solution.
- Higher vertical resolution near surface would help, but it causes other problems (numerical stability and enhanced variability)
- Post-processing with 1D or 3D models (but boundary conditions may be difficult)
- Intercomparisons very useful: they can launch the start of new development from the identification of the weaknesses to focus on.

DATA

- Observations for initialisation vs. observations for validation
- Remote sensing will provide better data (e.g. land use): but data not good in boundary layer in general
- An ideal project could be a comprehensive field experiment combined with Large Eddy Simulation runs
- Need to better use existing campaign database: Lindenberg, Sodankylä and, especially for aerosols, ParisFog (+ influence of large amount of pollution aerosols)

- Aerosols anyway more and more incorporated for other applications (Air Quality, Climate, Visibility), thus relevant to put efforts on aerosol research.
- Visibility calculation may need some re-assessment
- Soil-snow properties for heat conduction to be better determined and modelled

SPECIFIC CONDITIONS

Their dedicated study may bring important new insight to improve physical understanding

- Specific case of fog over snow
  slight supersaturation over ice, calm conditions, not enough CCN for ice fog to form
- Stratus snowing down at -12 degrees + phase change
- Lifted fog deserves special attention
- Sea fog deserves attention.
- Visibility reduction by dust can be a problem in certain locations (Canary Islands). Not included in the current models.
- Snowfall, blowing snow => decrease of TKE -> increase of wind