

Protocol of the Inca-Meeting, Nov. 20, 2001, Oberpfaffenhofen

Participants:

Frank Arnold, Frederique Auriol, Janine Baehr, Reinhold Busen, David Duda, Peter Derkes, Markus Fiebig, Frode Flatoy, Jean-Francois Gayet, Klaus Gierens, Franz Immler, Radovan Krejci, Hermann Mannstein, Bernhard Mayer, Andreas Minikin, Sergey Oshchepkov, Joelle Ovarlez, Hans Schlager, Otto Schrems, Ulrich Schumann, Marco Seifert, Johan Ström, Peter van Velthoven, Peter Wendling, Helmut Ziereis

The meeting was opened by Johan Ström and Ulrich Schumann. Schumann points towards the new EC Report "European Research in the Stratosphere 1996-2000". Copies are to be distributed by the EC, those who don't get it automatically can request a copy. The 6th framework will contain a section "Global Change and Ecosystems" where proposals can be submitted in the field of "atmospheric composition". The call for proposals, expected for autumn 2002, is open for many countries, like China, former Soviet Union countries, and all Mediterranean countries. Partners from the US can also apply; a formal cooperation agreement with NSF has been settled. An international workshop on "Aviation and Atmosphere" will be organized, it is planned for about June 2003, possible location could be Seeheim.

Financial aspects of the field experiment:

Johan Ström reminds that the invoices for the joint expenses during the field campaigns have been sent very late. Problems arising from that are currency exchange losses, delays in payments by the EU, as these are dependent on the expenses of the previous period, and delays in delivering the 6 months reports, as they have a financial report included.

In general cost sharing is thought to be a proper and money saving procedure, but improvements in the billing and payment procedures are necessary and an agreement on that should be got in advance for future projects.

Final Project Report

Johan Ström summarises the EU request for reports during the course of a project. According to this schedule the final project report is due 31th March 2002. This will consist of two separate reports, a 12 month report covering the second project year, and an up to 50 pages publishable report covering the whole project period. Executive summaries and management reports are in addition to these scientific reports.

As **input** for all these reports the following pieces of information are **needed from all project participants**:

A table with comparison between planned and used manpower and financial resources by WP (work package) and partners. Johan Ström suggests that this is done in a more general way than table. If there are no large deviations to the proposed manpower usage, we simply refer to the matrix in the Description of Work (DOW) document. With regards to the financial resources it would be helpful if partners could indicate if one or more items were more (or less) costly than expected. For instance, travel and subsistence

to Chile ran higher than expected. In any case details about what was spent on what will be given in the cost statement.

- A brief summary on co-ordination of the information between the partners and communication activities (e.g. organized meetings, conference attendances, co-operation with other projects / networks,). For instance, Klaus Girens was visiting LaMP; PATZI etc.
- A list of peer reviewed articles, non refereed literature, and planned publications (type, date, content). Please collect all your conference abstracts and proceedings.
- The second 12 month report should more or less follow the first 12 month report. This report is organized in Work packages. A detailed description of the work packages (max. 4 pages per work package) is structured in the following way:
 1. Objectives
 2. Methodology and scientific achievements related to Work Packages including contribution from partners
 3. Socio-economic relevance and policy implication
 4. Discussion and Conclusions

For the second point the work package coordinators would need input from the colleagues contributing to that work package (**until end of January**). Because the second year contains no campaigns and only deals with data analysis, the report could focus on results. Methodology is already given in the first report.
- For the final report Johan Ström will merge the two yearly reports. However, if you find that there is not enough space to cover all your findings in the second year report, please provide me with text that I can add in the final report.
- Contributions to the Technical Implementation Plan (TIP) are needed, details can be found on the website <http://www.cordis.lu/fp5/tip.htm> . Please, see also the draft TIP that was sent to partners before the last meeting in Germany.

After some discussion it was decided, that the final report shall be organized according to work packages and not be a compilation of papers presently submitted or finally prepared. This does not exclude that presenting a result makes cross-reference to different work packages possible.

A time table for the project report activities is given below:

November	Week 3	INCA meeting DLR
	Week 4	
December	Week 1	Work on data and papers
	Week 2	
	Week 3	
	Week 4	

January	Week 1	
	Week 2	
	Week 3	Preparation of TIP
	Week 4	
February	Week 1	Signed TIP due
	Week 2	Contributions to final report due
	Week 3	
	Week 4	First draft of reports distributed
March	Week 1	Cost statements due
	Week 2	Next to final version of report distributed
Deadline	Week 3	Latest date to hand in the reports
	Week 4	Ström on vacation

Data Archive

The data archive is nearly completed, most of the campaign data are available, a small remaining part will be added and updated until the end of 2001.

Regarding data policy the partners agree, that data should be made available for scientist outside the project on request, but that providing the password should be controlled. Data can be shared with other scientists, as long as there is no competition to own internal project activities.

Individual scientific reports of the project groups

After the technical / organisational part of the meeting the participants reported about the data evaluation status. As far as papers on these topics are already prepared and distributed, the relevant section in these minutes is kept short.

Water Vapour (Joelle Ovarlez): The content of a paper ready for submission is summarised. The main goals are to show the NH-SH differences and to explain / parameterise them by applying a simple mathematical hypothesis.

Ice Crystals (Jean-Francois Gayet): A paper on small ice crystals in cirrus clouds is re-submitted after some improvements. This paper deals with the high number of small crystals observed in cirrus clouds, which so far was not accepted completely in the scientific community, but which was measured by different instruments and techniques during INCA in very good agreement.

Another paper is in preparation, which focuses on the NH-SH contrast of particle number concentrations, Ice water content, extinction coefficient and effective diameter as function of the relative humidity with respect to ice. The distinct differences lead to the interpretation, that in Punta Arenas less and larger particles / crystals have been observed compared to Prestwick.

NILU model developments (Frode Flatoy): Beside standard forecast parameters NILU has provided also forecasts of dust and sea salt concentrations for the INCA project. The dust concentration forecast has shown some weakness as no reliable emission inventory is available at least for Punta Arenas. The sea salt forecast looks okay, comparisons with measurements on board the Falcon show the same order of magnitude, but some

remaining differences. The sea salt concentration measured by the Göteborg group but not yet available would be helpful for further comparisons. A paper by A. Kraabol et al. is almost ready for publication.

Trace gases (Janine Baehr): Mean vertical profiles of NO_x , NO_y , O_3 and CO were presented for both Punta Arenas and Prestwick. A general trend to higher concentrations for the Prestwick site is clearly visible, additionally the Prestwick data agree quite well with those obtained during POLINAT.

Further on the data have been compared with the TROPOZ II data and with results of the MOZART model prediction. The agreement with the TROPOZ II data is good, the MOZART data agree reasonably for O_3 , CO and NO_x , however the NO_y concentration are overestimated by the model.

Different air masses can be distinguished and separated: Punta Arenas, Prestwick, and Tropics. The air mass age can be determined from the correlation of the chemical species. A relevant paper is close to completion.

N-S-contrast of aerosol particles (Andreas Minikin): The status of the work done by the DLR aerosol group is presented, an overview on the work packages already performed and planned for the near future is given including forthcoming publications.

Problems in the interpretation especially of vertical aerosol profiles arise from the fact, that the relevant processes happen at the tropopause. As the TP is varying with height, a normalisation with respect to the TP is applied to all data. Furthermore the data have to be split into clear air and in cloud situations. Presently the data evaluation focuses on the clear air profiles.

During the ferry flights situations with distinct altitude changes of air masses as deduced from 5 day backward trajectories are strongly correlated with particle concentrations. First comparisons with PAM Tropics data look promising.

Satellite retrieval of microphysical parameters (Bernhard Mayer): ATSR satellite data were used for an approach to retrieve the parameters τ , r_{eff} and crystal shape for ice clouds and τ , r_{eff} for low clouds, respectively. The discrimination between low clouds and cirrus is very good, ATSR data are available for March 23 in Punta Arenas and for one flight in Prestwick. First comparisons with in situ flight data show quite a good agreement with small deviation in the 10 percent range.

The major problem remaining is that the retrieval cannot be done automatically, but needs a lot of manual work.

LIDAR observations (Franz Immler): Data obtained from the MARL instrument during both INCA campaigns were presented. Most mean values of relevant parameters like cloud base and top, cloud height, and temperature) are quite similar for the NH and SH. In Prestwick in addition very thin aerosol or cirrus layers were observed.

A comparison with Falcon in situ data from April 10 shows a very good agreement with respect to the vertical structure and the mean extinction coefficient of the cloud, which was jointly observed. From color ratio data there is an indication for smaller particles in the NH compared to the SH.

NASA satellite analysis (Dave Duda): NASA has analysed Terra MODIS and GOES satellite data and calculated a one month statistic for both Punta Arenas and Prestwick. From these datasets the cloud amount and altitude, particle properties and further parameters shall be derived. As an example the mean particle diameter deduced from

the different satellites was shown, in addition the data have been selected to fulfill specific geometrical conditions:

	MODIS NH	MODIS SH	GOES SH
Diameter μm	51.6	47.7	56.0

Particle NO_y (Helmut Ziereis) : Particle NO_y is well correlated with the particle surface area given by the aerosol measurements. In the NH distinctly less NO_y uptake by particles is observed compared to the SH. The ratio between the condensed and the gas phase of NO_y varies between 0.5 and 30 percent, which corresponds to a 0.04 to 1.2 percent coverage of the available particle surface.

These data are about one order of magnitude lower than predicted by models and laboratory measurements. A possible explanation: Laboratory measurements are performed on plane surfaces with no other atmospheric gases present, which in the real atmosphere could already occupy a remarkable part of the particle surface area.

Deposition coefficient (Klaus Gierens): A possible explanation for the observed high amount of small ice crystals in cirrus clouds is given. When modelling the development of cirrus clouds, the deposition coefficient highly influences the crystal concentration and the size spectrum. From measurements it is evident, that the deposition coefficient is not a constant value at all, but strongly dependent on particle size. Applying these considerations the different growth rate of small and large ice crystals can be explained. Differences for homogeneous freezing and for the contrail case were outlined as well.

Residual particles and their properties (Johan Ström) : A number of questions were summarised in this talk dealing with absorption properties of particles in cirrus clouds, updraft velocities in clouds, the size and composition of residuals based on homogeneous and heterogeneous approaches, and a phenomenological model to explain the variety of measurements obtained. Absorbing particles in cirrus clouds appear in approximately the same amounts in the two campaigns, but the mean size of the absorbing particles is larger in the SH compared to what is observed in the NH. Despite the large variability in cirrus clouds with respect to crystal number density, a statistical analysis of data from INCA show that it is possible to talk about typical cirrus. The reason for this is that synoptic scale cirrus appears to form in a similar way, which is through gravity waves. Much of the observed variability in cirrus is therefore given by the different stages in the life cycle of the clouds. Residual particles from evaporated crystals were analyzed for their thermal stability. The results indicate that cirrus is formed on a larger fraction of volatile particles in the NH. On the other hand the fraction of non-volatile particles was large in both campaigns and typically larger than 30%.

Final Discussion:

The best way to publish the results was discussed. 2 papers have been submitted already, and further papers should be submitted by the individual authors on their own. The plan of asking for a special section in JRL was dropped. The new electronic journal <http://www.atmos-chem-phys.org> was recommended by Johan Ström.

Johan Ström again mentions the time table for the final report and asks everybody to report any problems or delays immediately.

Johan Ström closes the official part of the workshop, but fruitful discussions followed.

This report was compiled from detailed notes taken by Reinhold Busen.