MAP

The Mesoscale Alpine Programme

newsletter

no. 17
november 2002

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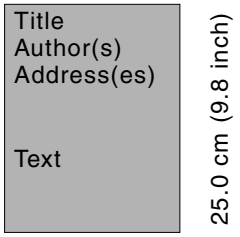
The MAP newsletter invites short articles on MAP-related topics. **Contributions** to the MAP newsletter should be sent to the editor Georg Mayr. **Please deliver your text (graphs included) in a camera-ready format** (pdf or ps in A4 format, see templates at the MAP Data Centre), and be sure that figures are suitable for black and white reproduction.

Your contribution must not exceed 2 pages!

Camera-ready format:
16.0 cm (6.3 inch)



Deadline for contributions to the MAP newsletter No. 18:
28 February 2003 (to appear in April 2003)

Editorial

This summer marked the first time the MAP Annual Meeting was held jointly with another conference. The joint nature of the AMS 10th Conference on Mountain Meteorology and the MAP Meeting 2002 offered a wonderful opportunity for the MAP community to see how their research complements that of other recent field programs focusing on orographically modified atmospheric flow. The synergy between MAP and these other programs was nicely illustrated by the invited talk given by Bob Houze in which he compared orographic precipitation in MAP and IMPROVE II, a field program that took place in the Oregon Cascades in late November and December of 2001. On the other hand, the joint nature of this meeting also presented some limitations, such as abstract deadlines that were much earlier than those for past MAP Meetings and higher registration fees, concerns that extend beyond the MAP community. The AMS Mountain Meteorology Committee has already initiated discussions on how they might be able to reduce the time between the abstract deadlines and the conference and ways to keep down the costs related to attending the next AMS Conference on Mountain Meteorology.

Given the timing of the initial abstract submission deadline (just a little over three months after Sep 11), we were pleasantly surprised to find almost 200 submissions, of which over a third were related to MAP. This overwhelming response meant our program committee had the challenging task of finding an optimal mix between oral and poster presentations that would fit all these exciting papers into 4.5 days. The submissions represented a diverse range of topics spanning from turbulent to planetary scales and from slope-valley flows to orographic precipitation. The diversity of the research being done within the MAP community was high-lighted by the fact that only a few of the conference sessions did not include at least one paper related to MAP. Although the week was jam-packed with conference sessions and working group meetings, we did manage to squeeze some time into the schedule for attendees to tour the Utah Olympic Park and a BBQ at a local park.

Another aspect of the meeting that I would like to high-light is the participation by students from the MAP community. I was delighted to see a good showing of students from the European community (as well as our US contingency!), despite the extra costs associated with overseas travel. The EMS student travel awards were a welcome addition that I hope EMS will be able to offer in the future. Attending a conference and being able to present your results to the community are a priceless opportunity for students! The caliber of research being done by the students from the MAP community was reflected by the fact that all three student paper awards (one for best oral and a tie for best poster) were received by students pursuing MAP-related research.

I am looking forward to hearing about the progress everyone has made on their data analysis and modeling work the next time the MAP community gathers to present their new results at the joint ICAM / MAP Meeting 2003!

Louisa Bogar Nance
CIRES/NOAA/ETL, Boulder, CO

Summary of the 3rd and 4th MSC Meeting

Andrea Rossa, MeteoSwiss, 8044 Zurich, Switzerland

Three years after the field phase the MAP Steering Committee (MSC) found itself surprisingly busy with a number of important issues. In a very broad sense they are related to dealing with MAP's results and are, as such, important and exciting. A first workshop on societal impact took place in order to start the process of demonstrating that MAP indeed was capable of benefiting the public at large. On a more detailed level, there are still numerous aspects of the SOP data that need careful attention, e.g the final results of the about-to-end data quality control project, the Vaisala radio sounding dry bias problem, and the SOP reanalysis. Finally, the dissemination of the MAP results in journals and conferences is proceeding very well.

In the following a report is given on the MSC Meetings of Park City, UT, USA 21-22 June 2002, and Bad Tölz, Germany 25-26 October 2002. Some of the issues discussed in these meetings are reported on in separate articles in this newsletter.

Societal impact studies on research activities become increasingly important. The WMO WWRP (World Weather Research Programme) advised MAP to include a societal impact component to demonstrate the utility of the research goals when related to end users and the public. Four societal impact experts were invited to a first dedicated one-day workshop organized in Bad Tölz, Germany 24-25 October 2002 (see "MAP-Societal Impact Workshop" on page 5), just before the forth MSC Meeting. After a number of presentations of both communities a strawman scenario for the Lago Maggiore area was discussed to seek a possible collaboration. On the scientific side, it became evident that dealing with uncertainties is crucial to the problem, and that probabilistic forecasts are an adequate means for this once the users learn how to use them. On the other hand, it became equally clear that the interaction with the variety of end users constitutes a challenge beyond meteorology and hydrology. The ICAM/MAP Meeting 2003, calls explicitly for societal impact papers related to extreme weather in the Alpine region, and plans on inviting a keynote on the subject.

It is obvious that data activities are central to the Evaluation Phase of MAP. In 2001 MAP issued a call for tenders for a reanalysis of the SOP data. The ECMWF was assigned the task and completed the reanalysis in 2002 (see "Status of the MAP-SOP Reanalysis Project" on page 7). E. Richard found some surprisingly large differences for IOP reruns when using the reanalysis as initial and boundary conditions as compared with the operational analysis. The MSC encouraged intensive numerical experimentation with the reanalysis in order to establish which analysis is best. To this end, the reanalysis and the analysis, as produced by the currently operational system, for the first month of the SOP is transferred to the MDC.

MAP placed an accent on data quality by introducing the effort DAQUAMAP (Data Quality Monitoring in MAP) early in the programme in 1997. The main goal of DAQUAMAP is to assess the performance of conventional in situ meteorological measurements in the MAP data domain, which comprises well over 10'000 stations that are run by several dozens of different institutions, in order to produce a more homogeneous data set for the entire Alpine region. DAQUAMAP ends at the end of 2002 and will provide the following deliverables:

- a list of gross errors for all parameters and stations;
- a correction proposal for all stations;
- histogram plots for all parameters and stations;
- the final report, including a flyer for EUMETNET.

The final report will be written in the spirit of a scientific publication and feature a four-page flyer to be distributed to EUMETNET. A review panel chaired by H. Volkert has been appointed to oversee the production of the final report.

A specific data problem that needs to be dealt with is the dry bias of the humidity measurement of the Vaisala RS80 radio sonde. C. Häberli, University of Vienna and MeteoSwiss, was assigned the task to apply correction schemes to SOP radio sounding data. MAP-NWS funds this activity with 25kEuro. An article on the dry bias correction of the SOP radio sonde data is planned for the next issue of the MAP newsletter.

Dissemination of MAP results is an important task of the MSC. At present, this is pursued with special issues of international scientific journals, and international conferences. As announced in MAP newsletter 16, a special issue of the Quarterly Journal of the Royal Meteorological Society (QJ) will be devoted to results of the SOP. The twenty-five accepted papers provide a good and representative balance between the eight SOP projects. The volume is planned as the January 2003 C issue of the QJ. Another special issue on the MAP SOP is in the process of being produced for the Journal Hydrology and Earth System Sciences (HESS).

To further enhance dissemination of MAP results, the annual MAP Meeting 2002 was combined with the AMS Mountain Meteorology Conference (MMC), which took place 17-21 June 2002 in Park City, UT, USA. Both the MAP and the AMS community, deemed the joint conference as very successful that could bear repetition For the same reason, in 2003 the MAP Meeting will be joined to the International Conference on Alpine Meteorology (ICAM), to be held 19-23 May 2003 in Brig, Switzerland (see "Ongoing Activities and Future Events" on page 12). For 2004, the MSC is currently negotiating with the AMS regarding a joint MMC/MAP Meeting, while a decision will be taken at the next MSC Meeting in Brig.

Finally, on the scientific side, the working group on radars (WG-RAD) fulfilled its SOP-geared objectives and is no longer active. R. Houze proposed to create a new working group focused on physical aspects of precipitation processes (WG-PP). The working group on hydrology will interact with the newly formed WG-PP but remain distinct. A single working group on the wet aspect of MAP was considered to be too broad.

First activities of the FACT (Forecasting in Alpine and Complex Terrain) initiative were reported in MAP newsletter 16. Since then the action laid dormant as its chairman P. Parson left his position in Innsbruck and no successor has been defined yet. On the other hand, the project Meteorisk, emerged from an Interreg II program, pursues goals that are much in the spirit of FACT. Meteorisk's main goals are:

- forecasting of extreme events in the Alpine region;
- managing data availability and exchange;
- optimizing communication channels (e.g. for alerts);
- intensifying transnational know-how transfer.

The main difference to FACT is Meteorisk's focus on products that serve the end users that deal with extreme events (e.g. civil protection agency). The MSC would welcome an integration of FACT into Meteorisk.

The next MSC Meeting is planned in the framework of the ICAM/MAP Meeting 2003 in Brig, Switzerland.

MAP-Societal Impact Workshop

Georg Mayr, University of Innsbruck, 6020 Innsbruck, Austria

The Scientific Steering Committee of MAP (MSC) decided to develop a societal impact subprogram within MAP. In order to formulate and develop this program, the MSC organized a workshop prior to its meeting at Bad Tölz in October 2002. Participants were members of the MSC and four

societal impacts experts: Leonard Smith (Oxford University), Rebecca Morss (NCAR), Eve Gruntfest (University of Colorado), and Rita Hausmann (MunichRe reinsurance). The first part of the workshop consisted of presentations of the MAP program, available data, simulations, and key scientific results as well as existing work on societal impacts of (intense) weather events. In a second part concrete steps for further collaboration between the two communities were discussed. It is expected to have several societal impact papers at the next MAP meeting in Brig.

MAP-NWS Follow-on Programme

Andrea Rossa, MeteoSwiss, 8044 Zurich, Switzerland

In its second meeting the MSC discussed the future of the MAP supportive structures, the Programme Office (PO) and the MAP Data Centre (MDC) beyond 2002, as the EUMETNET (EMN) funding through the programme MAP-NWS will have ended by then. The MSC emphasized that a continuation of the MDC beyond 2002 for at least three years is absolutely essential at this point of the Evaluation Phase. The PO and the EMN Coordination Officer Claude Pastre submitted a request for a MAP-NWS follow-on programme for the period 2003 to 2005 on a lower funding level covering the expenses for 1 person unit (PU) at the MDC and 0.2 PU at the PO. Formally it is an extension to the original MAP-NWS Contract. Apart from the continuation of the services as is, the most important point of the follow-on programme is the transfer of the MDC to an operational institution by the end of 2005 in order to guarantee permanent access to the MAP data sets.

In its April 2002 meeting the EUMETNET Council agreed upon the MAP-NWS follow-on programme. The UK joined MAP-NWS to become a formal member after having informally contributed since 1995. The financial contributions to cover the proposed budget of about 100 kEuro/yr are being negotiated at present and need to be defined for the December Council Meeting.

MAP working group news

Georg Mayr, University of Innsbruck, 6020 Innsbruck, Austria

Almost all groups met during the Mountain Meteorology Conference/MAP meeting at Park City in June 2002. Short news of possible interest to people outside the working groups are provided below:

Numerical modelling: Performed model intercomparison of the simulated precipitation fields of the heavy precipitation MAP IOP2B event. The results were presented at the Mountain Meteorology Conference/MAP meeting in Park City. Deviations of +- 30% between model and observations were largely due to different smoothing of the underlying topography. More details are available online at http://ams.confex.com/ams/10Mountain/10MntMet/abstracts/40549.htm.

Hydrology: Eleven papers will appear in a special issue of "Hydrology and Earth System Sciences". It is planned to run hydrological models for the IOP 2B with precipitation input from the Numerical Modelling WG's model intercomparison.

Precipitation Processes: This is a new working group initiated at the MSC meeting in Park City. It is the umbrella for "wet-MAP" research and already has an attractive website with extensive lists of historical and MAP references.

Radar: Its objectives were fulfilled. Accordingly, it was dissolved in Park City.

Gravity Wave Breaking: At the Park City this working group incorporated the former PV Streamers group. The 8 November 1999 (IOP15) is the best-observed case and main target of studies.

Lidar: Was asked to organize a special lidar session at the next MAP meeting in Brig.

FORM (foehn in the Rhine valley): Meets usually two times a year. A special issue of Meteorology and Atmospheric Physics is in preparation.

Mesoscale Alpine Climatology (MAC): Did not receive the applied-for EU-funding. Is exploring the possibility of becoming part of EUMETNET's UNIDART initiative (http://www.dwd.de/UNIDART).

Status of the MAP-SOP Reanalysis Project

Christian Keil, ECMWF, Reading, UK

Shortly after fruitful discussions at the MAP Meeting 2002 in Park City (Utah), the reanalysis of the MAP-SOP was launched on the VPP5000 at ECMWF. Using the ECMWF 12-hour 4D-Var global assimilation system (IFS), the MAP reanalysis was completed 80 days later.

Since autumn 1999, when the MAP field experiment took place, there have been substantial modifications in the IFS. The main model changes between the IFS operational in 1999 (Cycle 21R2) and the current version (Cycle 24R3) used for the MAP reanalysis are briefly summarized. During the SOP on 12 Oct 1999, the number of vertical levels increased from 50 to 60, a new orography and associated subgrid orographic fields were introduced, and changes occurred in the cloud and convection schemes. In 2000 other major changes involved an increase of the horizontal resolution to approximately 40 km (T511 spherical-harmonic representation), a revised treatment of the land surface scheme and a new parametrization of the long wave radiation. In the assimilation system, the 6-hour window 4D-Var was extended to 12 hours and the inner-loop resolution increased from T63 to T159. Recently, a new shortwave radiation transfer model and a new bias correction for satellite observations were included in the IFS.

One of the aims of the MAP reanalysis was to use as many extra MAP-SOP observations as possible. Special attention was paid to the European windprofiler data which were hardly used or monitored in 1999. After monitoring the data for the first two weeks of the MAP-SOP it became obvious that data of some profilers had to be excluded to avoid a degradation of the analysis quality. Consequently, data of 4 stations (Dunkeswell, Camborne, Clermont and L'Aquila) of the 16 European windprofilers which reported data during the MAP-SOP were blacklisted. Apart from this a priori exclusion all other extra MAP-SOP observations were available to the assimilation system.

The deliverables of the MAP-SOP reanalysis project are:

- A formatted archive of the additional MAP observations comprising data of European windprofilers, high-resolution radiosondes, surface stations, research aircraft data as well as dropsonde data. These data were formatted in BUFR code and archived in 6-hourly intervals throughout the MAP-SOP.

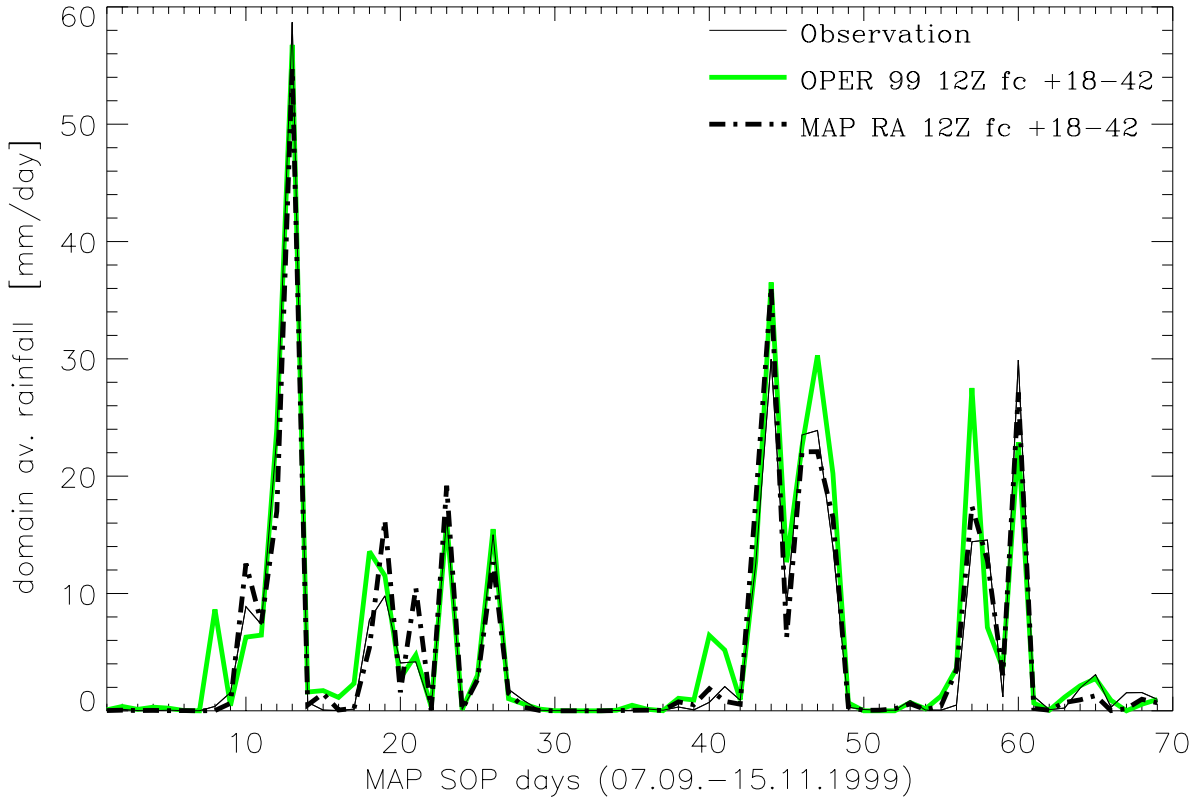


Figure 1. Time series of daily precipitation averaged over the Po catchment (extending from 7 E to 12 E and 45 N to 46.5 N) in the Southern Alpine Region.

- Analysed and forecast fields are stored in MARS. The basic analysed variables include not only the conventional meteorological wind, temperature and humidity fields, but also model products currently available in the ERA-40 reanalysis. The parameters of the MAP reanalysis are archived with a horizontal resolution of T511 for upper air fields, and a reduced Gaussian Grid with approximately uniform 40km spacing for surface und other grid-point fields. Upper air data were saved at each of the 60 "full" model levels and at 23 pressure levels. Additionally, a subset of upper air parameters is archived on fifteen isentropic surfaces as well as on the PV = +/- 2 surface. Tables of all analysed surface and upper air fields are given in Keil and Cardinali (2002). Global fields of two forecasts have been stored as well, i.e. forecasts initialized at 00 UTC +30 h and at 12 UTC +240 h.

In order to give a flavour of the MAP reanalysis, daily precipitation totals (i.e. 24 hour accumulations from 06 UTC onwards) for the Southern Alpine Region, an area comparable with the catchment of the river Po (extending from 7 E to 12 E and 45 N to 46.5 N) are presented here. Figure 1 shows the time series of daily precipitation averaged over the Po catchment area (66'000km^2) for the high-resolution precipitation analysis, the o-suite and the MAP reanalysis, respectively. Precipitation observations are taken from high resolution (25km) analyses of Alpine rain-gauge observations embracing roughly 5000 rain-gauges. Peak values are found for IOP2b (20 Sep 1999; day 13 in Fig. 1), when 27 individual stations reported rainfall amounts exceeding 200 mm in 48 hours. Generally, timing of the events is well represented in both suites. The operational forecast performs well, capturing the majority of the events recording more than 10mm/day area averaged

precipitation. The MAP reanalysis shows an even better agreement with observations, e.g. on days 10 and 40 the spurious rainfall predicted by the operational forecast is omitted. However, the amount of rainfall is slightly overestimated.

At the recent meeting of the MSC in Bad Tölz, Germany, it was decided to transfer all BUFRized MAP-SOP observations and a subset of 3 hourly main analysed fields on model levels for the European region to the MAP Data Centre (MDC) in Zurich. Additionally, analyses for the same period (first 30 days of the MAP-SOP) of a control analysis using the same IFS system without all extra MAP-SOP data are being transferred as well. This shall allow detailed investigation of the MAP reanalysis data using, e.g., mesoscale models driven with the data.

Reference

Keil, C. and C. Cardinali, 2002: On the ECMWF Re-analysis of the MAP-SOP. Proc. of 10th Conference on Mountain Meteorology, AMS, 307-310.

MAP Data Centre Status

Hans Hirter, IACETH, 8093 Zurich, Switzerland

The MAP Steering Committee emphasized that the maintenance of the MDC services at the current level is vital for the Evaluation Phase of MAP. Further, technology and design of the MDC go back to the late 90ies and are dated. We are therefore in the process of introducing a new and more powerful system along with enhanced security measures. We thought it useful to add a section with tips and trick for MDC users, and updated the MDC access statistics.

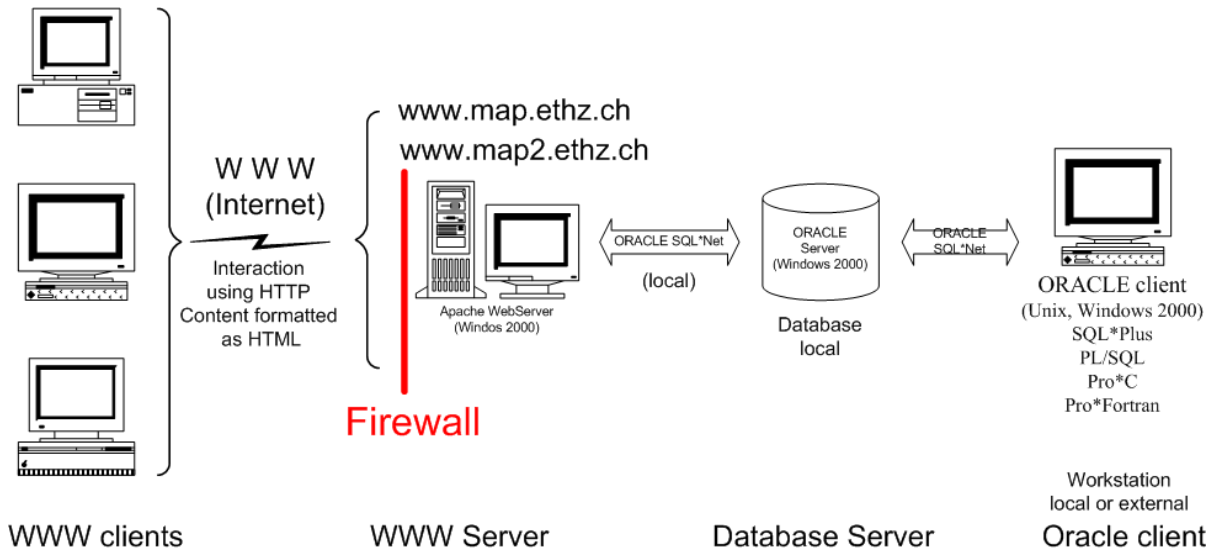


Figure 1. The new configuration of the MAP Data Centre WWW as operational from January 2003.

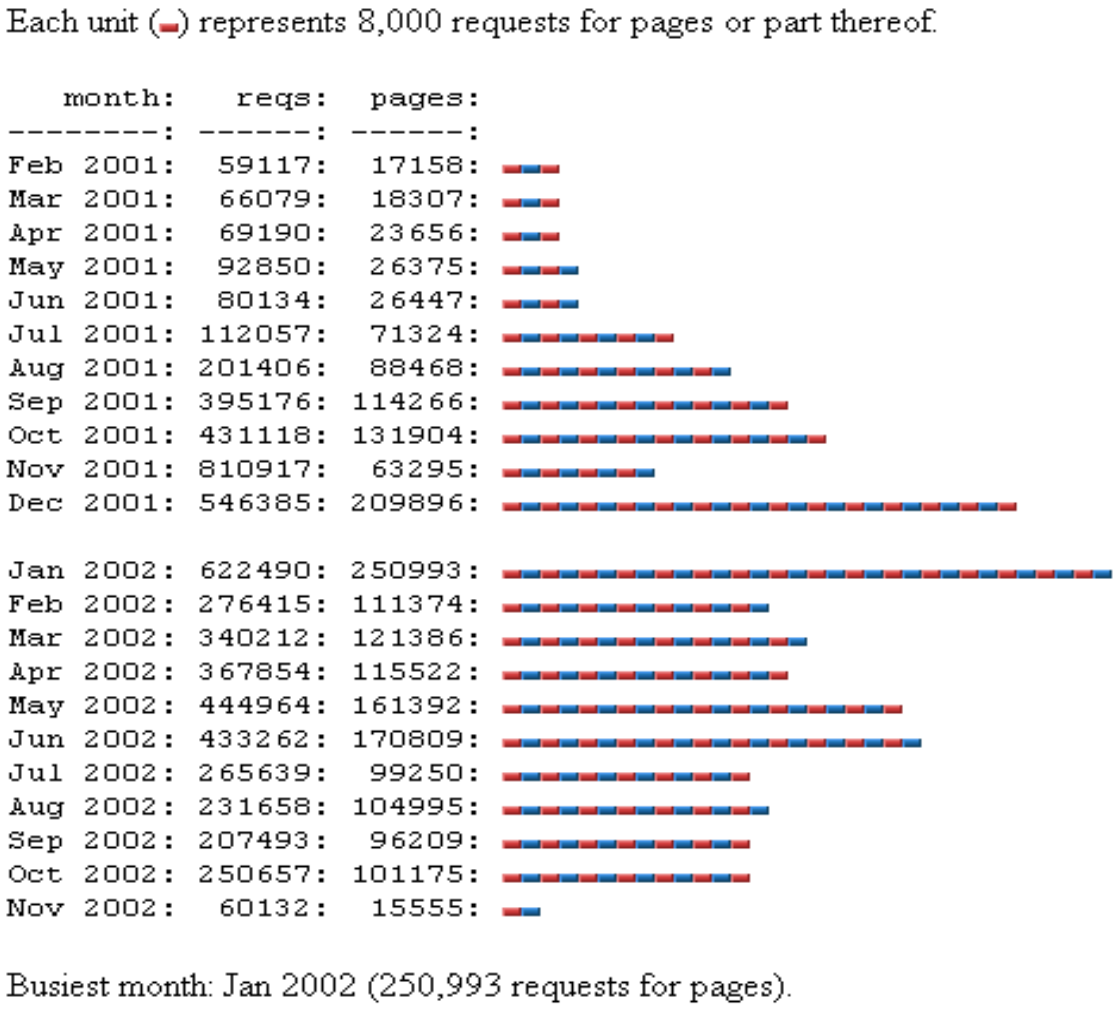


Figure 2. Monthly Web traffic at MDC in 2001/2002.

MAP Mailing List

Subscribe to the MAP Mailing List if you do not want to check the MDC home page regularly. The MAP Mailing List is a new information service of MAP Data Centre for all MAP people. Everybody on the list will receive information about major changes and news at MDC. The link is www.map2.ethz.ch/maillist/maillist.php. There you can subscribe or unsubscribe to the MAP Mailing List.

New Hardware

We decided to run the MDC only on one system as from January 2003 (see Fig. 1). Up to now we had a productive MAP (UNIX) and a developer system MAP2 (Windows). The Intel/Windows system reduces our hard- and software costs. In the last months we moved all data from MAP to MAP2.

During the last months we had a lot of visits from hackers. They tried to attack both systems www.map.ethz.ch and www.map2.ethz.ch. Up to now the hackers have had only one success. They used our public FTP server for exchanging cracked software. So we had to close our FTP server for public writing. To secure our system we installed a software firewall, which in general does not affect the user. But if you want to check if the MDC is alive you must take the firewall in account (see Tips and Tricks).

Until January 2003 you can reach the MDC on www.map.ethz.ch and www.map2.ethz.ch, the latter being faster and therefore recommended. If you use FTP please notice that http://www.map.ethz.ch and ftp://map.ethz.ch is one pair and http://www.map2.ethz.ch and ftp://lappc-9.ethz.ch is the second pair. That means if you retrieve data from MAP you will find your results on ftp://map.ethz.ch but if you use MAP2 you will find your result on ftp://lappc-9.ethz.ch.

Tips and Tricks

- If you use the command line tool *ping* to check if MDC is alive, you will never get an answer. The firewall blocks all external traffic except http and ftp! So you have to check Port 21 or 80 to get an answer from MAP server.

- FTP can be used in two modes: active or passive. Our browser uses the passive FTP mode. FTP tools use normally active FTP. You should prefer the FTP tools, because these tools are able to restart a broken line at the point of breaking.

- It is advisable to use MAP2 (http://www.map2.ethz.ch). To request data from the database MAP2 is faster than from MAP. The data are physically on MAP2 and MAP uses a database link to access the data.

- If you do a database request for any SOP surface data on your Web Browser and you receive an error message after a long time of waiting, you have the possibility to get the data directly by FTP. This error appears only when the MAP ORACLE database is very busy or your data request is so large. You must go back one page on your Web Browser to find out the name of your data file. On the Web Browser form you will find the name under "File output options: Filename". You can try to fetch the data directly by FTP after a while (1 hour). On your Web Browser you must type in the following command: "ftp://lappc-9.ethz.ch/mappubout/filename“ on MAP2. If you use an FTP tool, you must first connect to the MAP FTP Server (lappc-9.ethz.ch) with anonymous login. Now you must type in the command "get /mappubout/filename" for fetching the data file.

MAP Data Centre access statistic

In the last 20 months there was a lot of Internet traffic at MDC. On average, the MDC had 9877 requests per day or 6'365'205 accesses in the last 20 months. Counting the various pages on our site, we got 3320 requests for pages per day or 2'139'756 requests for pages per 20 months. Figure 2 shows the monthly traffic in the last period. The average data transfer rate was 218 Mbytes per day or 137'301 Mbytes per 20 months.

In November the MDC was contacted by different search engines; in this particular case on the 3rd and 4th. This explains the tremendous difference between “requests” and “requests for pages”. The number of “requests” means the total number of files downloaded from our server (including graphics), and the number of “requests for pages” just counts the various pages on our site.

The number of distinct hosts (the number of different computers from which requests have come) was 53'211 hosts. The domain report list contains more than 100 different countries from which files were downloaded. Table 1 shows the top-ten domains of computers which requested files. If we look at this list a little closer, we find countries all over the world like Israel, Saudi Arabia, India, China, Malaysia, Taiwan, Australia, Peru, Costa Rica ...

Table 1 Top ten domains of computers which requested files.

requests	%bytes	domain
2737672	34.47%	.ch (Switzerland)
583039	11.76%	.net (Network)
470679	10.00%	.come (Commercial)
272203	6.05%	.it (Italy)
174333	1.57%	.fr (France)
117762	1.57%	.edu (USA Educational)
53457	0.95%	.de (Germany)
89234	0.85%	.at (Austria)
9304	0.81%	.jp (Japan)
33644	0.80%	.uk (United Kingdom)

The top-two browsers with the largest numbers of requests are Netscape with 687'000 and Internet Explorer with 985'000 requests. It is the second time that Internet Explorer has more requests than Netscape. As for the operating systems, we detected 1'218'000 requests from Windows, 421'000 request from UNIX, and 42'000 request from Macintosh systems. But the major part was an unknown operation system. The operation system of search engines and surfers which access the MDC through a firewall give no information about their operating system. Based on this, we decided to develop our Web interface primarily for Internet Explorer and Netscape and to give up some fancy features and fonts.

Ongoing Activities and Future Events

Brig, Switzerland, wonderfully located in one of the major valleys of the Alps, is getting ready to host the first edition of the joint ICAM and MAP Meeting! ICAM, the traditional biennial conference on mountain meteorology held in one of the Alpine countries, is an optimal platform to enhance the dissemination of MAP result.

The International Scientific Programme Committee, composed of C. Schär (CH, chair), P. Bougeault (F), M. Gajic-Capka (CRO), G. Gregoric (SI), R. Houze (USA), G. Poulos (USA), R. Ranzi (I), R. Steinacker (A), P. Winkler (D), invites you to submit a short abstract for an oral or poster presentation. The submission is handled online under www.icam2003.ch. The communications may address the scientific topics of ICAM/MAP:

- dry and moist flow across and around high topography (Foehn, gap flow, mountain waves, gravity wave breaking, turbulence);
- orographic clouds and precipitation;
- hydrological mechanisms;
- thermally driven flows and boundary layer structure;
- snow and ice in mountainous terrain;
- mountain climates;
- operational analysis and forecasting challenges in complex terrain.

The papers may cover theoretical, observational or numerical modelling aspects and MAP activities in a broad sense. In particular, we also encourage societal impact studies with direct relevance to extreme weather events in the Alps.

A short abstract (max. one page) to one of the above subjects can be submitted online under www.icam2003.ch --> 'abstract submission', or via email as plain text to *abstracts*@icam2003.ch. If you choose email please make sure to include all requested information. i.e. author(s), institution(s), abstract title, main text, and corresponding author's address (see also instructions on our website).

The time table as of today is as follows:

- deadline for submission of short abstracts is **12 January 2003**;
- authors will be informed about acceptance of their contribution as oral / poster by 28 February 2003
- The third circular will be sent out by the end of January 2003, with more detailed information on the programme, hotel reservation, travel information, etc;
- the conference programme will be available on the web by mid March 2003;
- deadline for early registration will be 31 March 2003
- deadline for extended abstracts of two to four pages is **6 April 2003**;

The local organizing committee is looking forward to seeing you in Brig for the first combined ICAM and MAP Meeting in 2003!

Activities within MAP

date	event
May 19-23, 2003	MAP Meeting 2003 and Int. Conference on Alpine Meteorology (ICAM), Brig, Switzerland (http://www.icam2003.ch)
May 23, 2003	Fifth MSC Meeting in Brig, Switzerland
May 23-24, 2003	Joint ninth IGP/sixth MAP-NWS Board Meeting in Brig, Switzerland

Future events related to MAP

date	event
Nov 18-22, 2002	2nd European Conference on Radar Meteorology (ERAD), Delft, The Netherlands (http://www.copernicus.org/erad/index2002.html)
Dec 12-13, 2002	SRNWP workshop on numerical techniques, Toulouse, France (http://srnwp.cscs.ch/Lead_Centres/web_LC_NT.html)
Apr 2003	SRNWP workshop on verification, De Bilt, The Netherlands (http://srnwp.cscs.ch/Lead_Centres/LC_Workshops_with_reports.html)
Apr 6-11, 2003	EGS-AGU-EUG joint assembly, Nice, France (http://www.copernicus.org/egsagueug)
May 5-7, 2003	SRNWP workshop on physical adaptation, Vienna, Austria (http://srnwp.cscs.ch/Lead_Centres/LC_Workshops_with_reports.html)
Jun 30-Jul 11, 2003	IUGG 2003, Sapporo, Japan (http://www.jamstec.go.jp/jamstec-e/iugg)
Oct 27-29, 2003	Fifth international SRNWP workshop on non-hydrostatic modeling, Bad Orb, Germany (http://srnwp.cscs.ch/Lead_Centres/srnwp_2003_leaflet.pdf)

Contributions to the AMS MMC/MAP Meeting 17-21 2002 June Park City, UT, USA

For the first time this year the MAP community embedded the annual meeting in the AMS Mountain Meteorology Conference. Since extended abstracts are already contained in the AMS Preprints, this fall issue of the MAP newsletter will be unusually slim: only titles and authors of the presentations are listed. If you do not have the Preprint Volume you can access program, abstracts, and, if available, extended abstracts online at: http://ams.confex.com/ams/10Mountain/10MntMet/program.htm

SESSION 1: PBL STRUCTURE AND CIRCULATIONS I

1.1 VERTICAL TRANSPORT AND MIXING: SCIENTIFIC CHALLENGES AND FIELD PROGRAMS (INVITED PRESENTATION). J. C. Doran, PNNL, Richland, WA

1.2 DOWN-BASIN DRAINAGE JET OBSERVED DURING VTMX: LARGE-SCALE CONTROLS AND EFFECTS ON LOCAL-SCALE FLOWS. Robert M. Banta, NOAA/ERL/ETL, Boulder, CO; and L. S. Darby and B. W. Orr

1.3 THE INTERACTION OF DOWN-VALLEY AND CANYON FLOWS AND THEIR EFFECT ON MEAN VERTICAL MOTIONS IN THE SALT LAKE VALLEY. Jerome D. Fast, PNNL, Richland, WA; and L. S. Darby and R. M. Banta

1.4 KATABATIC FLOWS ON A LOW-ANGLE SLOPE IN THE SALT LAKE VALLEY: OVERVIEW OF THE VTMX 2000 SLOPE EXPERIMENT. C. David Whiteman, PNNL, Richland, WA; and S. Zhong and R. Mayr

1.5 CIRCULATIONS IN THE SALT LAKE CITY BASIN: THE INFLUENCE OF AIR EXCHANGES WITH ADJACENT BASINS AND CANYONS. Keeley R. Costigan, LANL, Los Alamos, NM

SESSION 2: PBL STRUCTURE AND CIRCULATIONS II

2.1 RELATIONSHIP BETWEEN TRACER BEHAVIOR IN DOWNTOWN SALT LAKE CITY AND BASIN-SCALE WIND FLOW. Lisa S. Darby, NOAA/ERL/ETL, Boulder, CO; and K. J. Allwine and R. M. Banta

2.2A GAP FLOW AND VERTICAL MIXING AT THE SOUTHERN END OF THE GSL BASIN (FORMERLY PAPER P1.11). James O. Pinto, Univ. of Colorado and NCAR, Boulder, CO; and D. B. Parsons, W. O. J. Brown, S. Cohn, N. Chamberlain, and B. Morley

2.3 AN EVALUATION OF FINE-SCALE MM5, RAMS, AND MESO ETA SIMULATIONS USING VTMX FIELD CAMPAIGN DATA IN THE SALT LAKE VALLEY. Shiyuan Zhong, PNNL, Richland, WA; and J. D. Fast

2.4 FIELD MEASUREMENTS OF VERTICAL POLLUTION TRANSPORT IN A HIGH ALPINE VALLEY IN SOUTHERN SWITZERLAND. Stephan Henne, Paul Scherrer Instiut, Villigen, Switzerland; and A. S. H. Prévôt, M. Furger, and S. Nyeki

2.5 THE RELATION BETWEEN SLOPE FLOW SYSTEMS AND CONVECTIVE BOUNDARY LAYERS IN STEEP TERRAIN. Christian Reuten, Univ. of British Columbia, Vancouver, BC, Canada; and D. G. Steyn, K. B. Strawbridge, and P. Bovis

SESSION 3: PBL STRUCTURE AND CIRCULATIONS III

3.1 THE BULK MOMENTUM BUDGET IN KATABATIC FLOW: OBSERVATIONS AND HYDRAULIC MODEL RESULTS. Thomas Haiden, Central Institute for Meteorology and Geodynamics, Vienna, Austria; and C. D. Whiteman

3.2 FURTHER INVESTIGATIONS OF THE “ORA DEL GARDA” VALLEY WIND. Massimiliano de Franceschi, University of Trento, Trento, Italy; and G. Rampanelli and D. Zardi

3.3A STABLE BOUNDARY-LAYER FLOW OVER HILLS IN THE WIND TUNNEL (FORMERLY PAPER P1.2). Samantha Jane Arnold, University of Leeds, Leeds, West Yorkshire, United Kingdom; and I. Castro, S. Mobbs, A. Robins, A. Ross, and S. B. Vosper

3.4 ON THE SPATIAL VARIABILITY OF ATMOSPHERIC RADIATION IN AN ALPINE VALLEY. Nicolas Matzinger, Swiss Federal Institute of Technology, Zurich, Switzerland; and E. van Gorsel, R. Vogt, A. Ohmura, and M. W. Rotach

3.5 OBSERVATIONS AND NUMERICAL MODELING OF THE DAYTIME BOUNDARY LAYER STRUCTURE IN THE RIVIERA VALLEY, SWITZERLAND. Stephan F. J. De Wekker, Univ. of British Columbia, Vancouver, BC, Canada; and D. G. Steyn, M. W. Rotach, J. D. Fast, and S. Zhong

■ POSTER SESSION 1: PBL PROCESSES AND MODELING

P1.1 MODELLING WIND TUNNEL EXPERIMENTS OF STABLE BOUNDARY-LAYER FLOW OVER HILLS. An Ross, University of Leeds, Leeds, West Yorkshire, United Kingdom; and S. J. Arnold, S. B. Vosper, and S. D. Mobbs

P1.2 PAPER HAS BEEN MOVED TO SESSION 3, NEW PAPER NUMBER 3.3A.

P1.3 NUMERICAL MODELING OF AIRFLOW IN THE VICINITY OF THE JORDAN NARROWS IN THE SALT LAKE VALLEY. Ying Chen, Stanford University, Stanford, CA; and R. L. Street and L. Ludwig

P1.4 PERFLUOROCARBON TRACER EXPERIMENTS DURING VTMX 2000. Jerome D. Fast, PNNL, Richland, WA; and K. J. Allwine, J. C. Torcolini, and R. N. Dietz

P1.5 AN EVALUATION OF THE SIGMA AND STEP-MOUNTAIN VERTICAL COORDINATES IN THE MESO ETA MODEL AT SUB-KILOMETER GRID SPACING. Jerome D. Fast, PNNL, Richland, WA; and S. Zhong

P1.6 RADAR AND ACOUSTIC OBSERVATIONS DURING VTMX FIELD-CAMPAIGN. Paco Lopez Dekker, Univ. of Massachusetts, Amherst, MA; and A. N. Bajaj and S. J. Frasier

P1.7 SIMULATIONS OF THE CANYON DRAINAGE FLOW AND ITS INTERACTION WITH THE STABLE AIR OF THE SALT LAKE BASIN. James R. Stalker, LANL, Los Alamos, NM

P1.9 VARIATIONS IN SURFACE TUBULENCE CHARACTERISTICS OVER THE SALT LAKE VALLEY DURING VTMX2002. J. C. Doran, PNNL, Richland, WA

P1.10 BOUNDARY LAYER OBSERVATIONS OF COLD AIR POOLS IN A MOUNTAIN BASIN. Elford G. Astling, West Desert Test Center, Dugway, UT; and C. A. Biltoft, D. Storwold, and S. A. McLaughlin

P1.12 HOW WELL CAN MESOSCALE MODELS CAPTURE KATABATIC FLOWS OBSERVED IN A LARGE VALLEY. Shiyuan Zhong, PNNL, Richland, WA; and C. D. Whiteman and T. Haiden

P1.13 THERMALLY DRIVEN FLOWS IN CALIFORNIA'S CENTRAL VALLEY: A COMPREHENSIVE ANALYSIS USING DATA FROM A DENSE WIND PROFILER NETWORK. Shiyuan Zhong, PNNL, Richland, WA; and X. Bian, C. D. Whiteman, and S. Tanrikulu

P1.14 EVOLUTION OF ELEVATED STRATIFIED LAYER DURING VTMX. Richard L. Coulter, ANL, Argonne, IL; and M. S. Pedour and T. J. Martin

P1.15 ALONG-VALLEY STRUCTURE OF DAYTIME VALLEY FLOWS IN THE WIPPTAL. Magdalena Rucker, Univ. of British Columbia, Vancouver, BC, Canada; and R. M. Banta and D. G. Steyn

P1.16 ANALYSIS OF IOP2B LAND-SEA BREEZE CASE DURING THE ESCOMPTE EXPERIMENT. Sophie Bastin, Service d'Aéronomie, Paris, France; and P. Drobinski, A. M. Dabas, O. Reitebuch, P. Delville, C. Werner, A. Delaval, C. Boitel, H. Hermann, E. Nagel, B. Romand, J. Streicher, B. Bénech, O. M. Bock, J. L. Caccia, P. Durand, and V. Guénard

P1.17 CIRCULATION CAUSED BY SURFACE HEATING IN A VALLEY: A PIV EXPERIMENT. Liu Huizhi, Chinese Academy of Sciences, Beijing, China; and S. Jianguo and Z. Boyin

P1.18 CLIMATE OF THE MOUNTAIN TOP STATION "SONNBLICK" IN COMPARISON WITH RADIOSONDE DATA. Matthias Ratheiser, University of Vienna, Wien, Austria; and S. Schneider, C. Häberli, R. Steinacker, W. Pöttschacher, and W. Gepp

P1.19 A SINKHOLE FIELD EXPERIMENT IN THE EASTERN ALPS. Reinhold Steinacker, Univ. of Vienna, Vienna, Austria; and M. Dorninger, S. Eisenbach, A. M. Holzer, B. Pospichal, and C. D. Whiteman

P1.20 IDENTIFICATION OF THERMAL STRUCTURE FROM AIRBORNE MEASUREMENTS IN AN ALPINE VALLEY WITH KRIGING TECHNIQUE. Gabriele Rampanelli, Univ. of Trento, Trento, Italy; and D. Zardi

P1.21 LARGE-EDDY SIMULATIONOF DOWNSLOPE FLOWS. Eric D. Skyllingstad, Oregon State Univ., Corvallis, OR

P1.22 TEMPERATURE INVERSIONS IN A LIMESTONE SINKHOLE IN THE ALPS. Stefan Eisenbach, Institute of Meteorology and Geophysics, Vienna, Austria; and A. M. Holzer, M. Dorninger, and R. Steinacker

P1.23 INVERSION LAYER IN STEEP VALLEYS AND THE EFFECTS OF TOPOGRAPHIC SHADING. Augustin Colette, Stanford Univ., Stanford, CA; and R. L. Street

P1.25 MULTI-SCALE FLOW INTERACTIONS IN COMPLEX TERRAIN. Keeley R. Costigan, LANL, Los Alamos, NM; and J. L. Winterkamp, D. L. Langley, and J. E. Bossert

■ SESSION 4: BOUNDARY LAYER TURBULENCE AND DIFFUSION

4.1 EDDY CORRELATION FLUX MEASUREMENTS IN AN ALPINE VALLEY UNDER DIFFERENT MESOSCALE CIRCULATIONS. Marco Andretta, Swiss Federal Institute of Technology, Zurich, Switzerland; and A. W. Weigel and M. W. Rotach

4.2 STRUCTURE OF THE ATMOSPHERIC BOUNDARY LAYER IN THE CENTRAL SALT LAKE VALLEY DURING THE AFTERNOON-TO-EVENING TRANSITION. William J. Shaw, PNNL, Richland, WA; and J. M. Hubbe

4.3 WAVES AND TURBULENCE OBSERVED OVER TWO CONSECUTIVE VTMX NIGHTS. Nappo, C. J., NOAA/ERL/ARL, Oak Ridge, TN; and R. Doboay and E. J. Dumas, Jr.

4.4 TURBULENCE AND MIXING IN THE NOCTURNAL BOUNDARY LAYER OVER A SLOPE: VTMX FIELD PROGRAM RESULTS. Marko Princevac, Arizona State University, Tempe, AZ; and P. Monti, H. J. S. Fernando, T. A. Kowalewski, and E. R. Pardyjak

4.5 DIRECT NUMERICAL SIMULATION OF EVOLVING TURBULENCE USING SURFACE HEAT FLUXES DERIVED FROM VTMX MEASUREMENTS. James C. Barnard, PNNL, Richland, WA; and W. J. Shaw

■ SESSION 5: OROGRAPHICALLY MODIFIED CYCLONE EVOLUTION

5.1 LARGE-AMPLITUDE GRAVITY-WAVE BREAKING OVER THE GREENLAND LEE AND THE SUBSEQUENT FORMATION OF DOWNSTREAM SYNOPTIC-SCALE TROPOPAUSE FOLDING AND STRATOSPHERIC-TROPOSPHERIC EXCHANGE. Melvyn A. Shapiro, NOAA/ERL/ETL, Boulder, CO; and S. Low-Nam, H. Olafsson, J. D. Doyle, and P. K. Smolarkiewicz

5.2 CYCLONE TRACKS IN THE VICINITY OF GREENLANDASPECTS OF AN INTERACTION PROCESS. Cornelia B. Schwierz, ETH, Zurich, Switzerland; and H. C. Davies

5.3 FLOW IN THE LEE OF GREENLAND-SIZE MOUNTAINS. G. N. Petersen, Univ. of Oslo, Oslo, Norway and Univ. of Iceland, Iceland; and H. Ólafsson and J. E. Kristjánsson

5.4 ANALYSIS OF AN OROGRAPHICALLY MODIFIED CYCLONE OVER THE WESTERN UNITED STATES DURING IPEX IOP3. Jason C. Shafer, NOAA/CIRP and Univ. of Utah, Salt Lake City, UT; and W. J. Steenburgh and J. A. W. Cox

SESSION 6: OROGRAPHIC PRECIPITATION I

6.1 DUAL-DOPPLER ANALYSIS OF THE KINEMATIC STRUCTURE OF A WASATCH MOUNTAIN WINTER STORM. Justin A. W. Cox, NOAA/CIRP and Univ. of Utah, Salt Lake City, UT; and W. J. Steenburgh and D. E. Kingsmill

6.2 THE IMPROVE-2 FIELD PROGRAM OVER THE CENTRAL OREGON CASCADES, PART I: MOTIVATION AND EXPERIMENTAL DESIGN. Clifford F. Mass, University of Washington, Seattle, WA; and P. V. Hobbs, M. T. Stoelinga, R. A. Houze, B. A. Colle, J. D. Locatelli, B. Colman, and N. A. Bond

6.3 SENSITIVITY OF OROGRAPHIC PRECIPITATION TO CHANGING AMBIENT CONDITIONS: AN IDEALIZED MODELING PERSPECTIVE. Brian A. Colle, SUNY, Stony Brook, NY

SESSION 7: OROGRAPHIC PRECIPITATION II

7.1 COMPARISON OF OROGRAPHIC PRECIPITATION IN MAP AND IMPROVE II (INVITED TALK). Robert A. Houze, University of Washington, Seattle, WA; and S. Medina

7.2 ROLE OF TOPOGRAPHY IN MM5 PRECIPITATION FORECAST FOR THE MAP SOP. Rossella Ferretti, University of L'Aquila, Coppito- L'Aquila, Italy; and R. Rotunno and T. Paolucci

7.3 HOW THE ALPINE TOPOGRAPHY INDUCES A CLIMATOLOGICAL PRECIPITATION MAXIMUM OF IN AUTUMN OVER THE LAGO MAGGIORE AREA. Francois Gheusi, ETH, Zurich, Switzerland; and H. C. Davies and J. Stein

7.4 MULTIPLE EXPRESSIONS OF UPSTREAM OROGRAPHIC BLOCKING DURING MAP. Olivier Bousquet, University of Washington, Seattle, WA; and B. F. Smull

7.5 AIRFLOW WITHIN MAJOR ALPINE RIVER VALLEYS: THE CONCEPT OF WET DRAINAGE FLOW. Matthias Steiner, Princeton University, Princeton, NJ; and O. Bousquet, R. A. Houze, and B. F. Smull

SESSION 8: OROGRAPHIC PRECIPITATION III

8.1 OROGRAPHIC PRECIPITATION AND AIRMASS TRANSFORMATION: AN ALPINE EXAMPLE. Ronald B. Smith, Yale University, New Haven, CT; and Q. Jiang, M. G. Fearon, P. Tabary, M. Dorninger, J. D. Doyle, and R. Benoit

8.2 THE RELEVANCE OF INSTABILITIES WITH HEAVY OROGRAPHIC RAINFALL DURING MAP IOP-2B. Sen Chiao, North Carolina State University, Raleigh, NC; and Y.-L. Lin

8.3 INTERCOMPARISON OF THE SIMULATED PRECIPITATION FIELDS OF THE MAP/IOP2B WITH DIFFERENT HIGH-RESOLUTION MODELS. Evelyne Richard, CNRS/UPS, Toulouse, France; and N. Asencio, R. Benoit, A. Buzzi, R. Ferretti, P. Malguzzi, S. Serafin, G. Zaengl, and J.-F. Georgis

8.4 OROGENIC SQUALL LINE OBSERVED WITH DOPPLER POLARIMETRIC RADARS DURING THE MAP EXPERIMENT. Pierre Tabary, Meteo France, Trappes, France; and G. Scialom, E. Richard, Y. Seity, and S. Soula

8.5 CLOUD-TO-GROUND LIGHTNING FLASH PRODUCTION DURING IOP 2A OF MAP: CORRELATION WITH DYNAMICS AND MICROPHYSICS. Y. Seity, Laboratoire d'Aérologie, Toulouse, France; and S. Soula, P. Tabary, and G. Scialom

8.6 MOIST AIRFLOW REGIMES OVER MORE OR LESS SMOOTH MOUNTAINS. Joel Stein, CNRM and Meteo France, Toulouse, France

SESSION 9: OROGRAPHIC PRECIPITATION IV

9.1 INFLUENCE OF SYNOPTIC AND MESOSCALE ENVIRONMENTS ON HEAVY OROGRAPHIC RAINFALL ASSOCIATED WITH MAP IOP-2B AND IOP-8. Yuh-Lang Lin, North Carolina State University, Raleigh, NC; and J. A. Thurman and S. Chiao

9.2 NUMERICAL ANALYSIS OF MAP IOP 15 CYCLOGENESIS AND ASSOCIATED PRECIPITATION. Andrea Buzzi, ISAO-CNR, Bologna, Italy; and M. D'Isidoro and S. Davolio

9.3 PREFRONTAL AND FRONTAL PRECIPITATION EVENTS DURING MAP IOP 5. Joze Rakovec, University of Ljubljana, Ljubljana, Slovenia; and G. Gregoric, T. Vrhovec, and N. Pristov

9.4 COMPARISON OF SOME FRONTAL STRATIFORM PRECIPITATION EVENTS OVER THE ALPINE CHAIN DURING MAP. Stephanie Pradier, Laboratoire d'Aerologie, Toulouse, France; and M. Chong and F. Roux

9.5 EFFECTS OF MOIST CONVECTION ON FLOW PAST 2D-TOPOGRAPHY. Oliver Fuhrer, ETH, Zurich, Switzerland; and C. Schaer

POSTER SESSION 2: OROGRAPHIC PRECIPITATION/OPERATIONAL AND NUMERICAL WEATHER PREDICTION

P2.2 TRACKING CLOUD PATTERNS BY RAPID SCAN IMAGERY IN THE ALPINE REGION. Martin Bolliger, MeteoSwiss, Zurich, Switzerland; and P. Binder and A. Rossa

P2.3 STUDY OF THE CONVECTION OVER MONTE ROSA USING S-POL OBERVATIONS AND FINE SCALE MESO-NH SIMULATIONS. Nicole Asencio, CNRM and Meteo France, Toulouse, France; and J. Stein and M. Chong

P2.4 A RAIN EPISODE RELATED TO A MESOSCALE GRAVITY WAVE DURING MAP. Renzo Richiardone, Univ. of Torino, Torino, Italy; and M. Manfrin

P2.5 HEAVY PRECIPITATION IN SE ALPS DURING IOP 8, 9, 10, 11. Uros Strajnar, Environmental Agency of the Republic of Slovenia, Ljubljana, Slovenia; and A. Poredos and T. Vrhovec

P2.6 LOW LEVEL FLOW PATTERNS ASSOCIATED WITH TWO HEAVY RAINFALL EVENTS DURING MAP. James A. Thurman, North Carolina State University, Raleigh, NC; and Y.-L. Lin

P2.7 IMPACT OF THE TIME AND SPACE HIGH RESOLUTION OBSERVATIONS ON THE WEATHER FORECAST OF IOP2B. Claudia Faccani, CETEMPS, Coppito-L'Aquila, Italy; and R. Ferretti

P2.8 HIGH-RESOLUTION SIMULATIONS OF THE CONVECTIVE LINE OBSERVED DURING MAP IOP2A: SENSITIVITY TO THE MICROPHYSICAL PARAMETERIZATION. Evelyne Richard, Laboratoire d'Aerologie, Toulouse, France; and J.-P. Pinty, P. Tabary, F. Lascaux, and G. Scialom

P2.11 FINESCALE OROGRAPHY AND THE MC2 DYNAMICS KERNEL. Robert Benoit, MSC, Dorval, QC, Canada; and C. Girard, M. Desgagné, S. Chamberland, and W. Yu

P2.12 REGIONAL PRECIPITATION VARIABILITY IN THE EUROPEAN ALPS 18031998 FROM HOMOGENISED INSTRUMENTAL TIME SERIES. Reinhard Böhm, Central Institute for Meteorology and Geodynamics, Vienna, Austria; and I. Auer, W. Schöner, M. Brunetti, M. Maugeri, C. Huhle, and T. Nanni

P2.13 THE IMPROVE-2 FIELD PROGRAM OVER THE CENTRAL OREGON CASCADES, PART II: SUMMARY OF IOPS. Brian A. Colle, SUNY, Stony Brook, NY; and C. F. Mass, M. T. Stoelinga, P. V. Hobbs, J. D. Locatelli, R. A. Houze, N. A. Bond, and B. F. Smull

P2.14 MICROPHYSICAL STRUCTURE OF OROGRAPHIC PRECIPITATION ALONG THE WASATCH MOUNTAINS DURING IPEX. David E. Kingsmill, DRI, Reno, NV; and H. Cai, J. A. W. Cox, and W. J. Steenburgh

P2.15 STRUCTURE AND EVOLUTION OF A TORNADIC COLD FRONT IN THE INTERMOUNTAIN WEST. David M. Schultz, NOAA/NSSL, Norman, OK

P2.16 REGIONAL SCALE MODELING FOR THE 2002 OLYMPIC WINTER GAMES. Daryl J. Onton, NOAA/CIRP and Univ. of Utah, Salt Lake City, UT; and A. J. Siffert, L. Chang, W. J. Steenburgh, and B. Haymore

P2.18 THUNDERSTORMS OF THE MT. EVEREST REGION: SPRING 1999, 2000. Kamal Thapa, City University of New York, New York, NY; and E. E. Hindman and Y. N. Rosoff

P2.19 A COMPARISON OF PRECIPITATION ESTIMATES OVER THE HIMALAYAS AND ANDES. Stephen W. Nesbitt, University of Utah, Salt Lake City, UT; and G. V. Mota

P2.20 INITIATION OF MESOSCALE CONVECTIVE COMPLEXES OVER ETHIOPIAN HIGHLANDS: A PRECURSOR TO TROPICAL CYCLOGENESIS. Christopher M. Hill, North Carolina State University, Raleigh, NC; and Y.-L. Lin

P2.21 QUANTITATIVE PRECIPITATION FORECASTING OF WINTERTIME PRECIPITATION IN THE SIERRA NEVADA. Ramesh K. Vellore, DRI, Reno, NV; and V. Grubisic and A. W. Huggins

P2.22 MOUNTAINTOP AND RADAR MEASUREMENTS OF SNOW GROWTH AND SNOWFALL RATE. Randolph D. Borys, Storm Peak Laboratory, Steamboat Springs, CO; and D. H. Lowenthal, S. Cohn, and W. O. J. Brown

P2.23 THE CLIMATE OF THE SOUTH AMERICAN ALTIPLANO. René D. Garreaud, Universidad de Chile, Santiago, Chile

P2.24 DESCRIPTION OF THE SEASONAL CYCLE OF LOW-LEVEL FLOWS FLANKING THE ANDES AND THEIR INTERANNUAL VARIABILITY. Lee A. Byerle, Univ. of Utah, Salt Lake City, UT; and J. Paegle

P2.25 OROGRAPHIC CLOUDS AND PRECIPITATION: A STUDY OF INDIAN MONSOON AND ITS IMPACT ON CLOUD DYNAAMICS AND PRECIPIATION IN WESTERN GHATS OF INDIA. Shanmuganandan Samarajalingam, Madurai Kamaraj Univ., Madurai, India

P2.26 OROGRAPHIC EFFECTS ON A CONDITIONALLY UNSTABLE FLOW OVER AN IDEALIZED THREE-DIMENSIONAL MESOSCALE MOUNTAIN. Shu-Hua Chen, Univ. of California, Davis, CA; and Y.-L. Lin

P2.27 A LINEAR TIME-DELAY MODEL FOR OROGRAPHIC PRECIPITATION. Ronald B. Smith, Yale University, New Haven, CT

P2.28 SOME COMMON INGREDIENTS FOR HEAVY OROGRAPHIC RAINFALL AND THEIR POTENTIAL APPLICATION FOR PREDICTION. Yuh-Lang Lin, North Carolina State University, Raleigh, NC; and S. Chiao, J. A. Thurman, D. B. Ensley, and J. J. Charney

P2.29 SOME CHALLENGES OF USING GRAPHICAL FORECAST EDITOR(GFE) OPERATIONALLY IN DIVERSE TERRAIN. Paul G. Wolyn, NOAA/NWSFO, Pueblo, CO; and D. Metze and K. Torgerson

P2.30 EVALUATION OF MC2 SIMULATIONS FOR A CASE OF SIGNIFICANT UPSTREAM BLOCKING DURING MAP. Bradley F. Smull, NOAA/NSSL, Norman, OK and University of Washington, Seattle, WA; and O. Bousquet and D. Luethi

P2.31 SIMULATION OF SNOW DRIFT AND SNOW DEPOSITION IN STEEP TERRAIN. Michael Lehning, ETH, Davos, Switzerland; and J. Doorschot, N. Raderschall, and T. Exner

P2.32 UNDERSTANDING OROGRAPHIC PRECIPITATION MECHANISMS USING POLARIZATION RADAR AND IN SITU TECHNIQUES. Sabine Goeke, NCAR, Boulder, CO

P2.33 A CASE STUDY ANALYSIS AND MODEL SIMULATION OF A COLUMBIA GORGE GAP FLOW EVENT. Justin Sharp, University of Washington, Seattle, WA; and C. F. Mass

P2.34 CELLULARITY IN OROGRAPHIC CONVECTION. Daniel Kirshbaum, University of Washington, Seattle, WA; and D. R. Durran

SESSION 10: OROGRAPHIC PRECIPITATION V

10.1 PRECIPITATION OVER MULTISCALE TERRAIN. Qingfang Jiang, Yale Univ., New Haven, CT

10.2 MT. EVEREST, 10 MAY 1996: STUDY OF A HIGH ELEVATION THUNDERSTORM. Yolanda N. Rosoff, City College of New York, New York, NY; and E. E. Hindman

10.3 THE IMPACT OF A PROMINENT RAIN SHADOW ON FLOODING IN CALIFORNIA'S COASTAL MOUNTAINS: A CALJET CASE STUDY AND SENSITIVITY TO THE ENSO CYCLE. F. Martin Ralph, NOAA/ERL/ETL, Boulder, CO; and P. J. Neiman, D. E. Kingsmill, E. D. Andrews, and R. C. Antweiler

10.4 THE INFLUENCE OF LAND-FALLING LOW-LEVEL JETS ON RAIN RATE IN CALIFORNIA'S COASTAL MOUNTAINS DURING CALJET. Paul J. Neiman, NOAA/ETL, Boulder, CO; and F. M. Ralph, A. B. White, D. E. Kingsmill, and P. O. G. Persson

SESSION 11: QUANTITATIVE PRECIPITATION FORECASTING

11.1 PREDICTABILITY ISSUES IN HIGH-RESOLUTION NUMERICAL PREDICTION OF STRATIFORM AND CONVECTIVE PRECIPITATION. Andre Walser, ETH, Zürich, Switzerland; and D. Luethi and C. Schaer

11.2 LANDFALLING CYCLONE FORECAST SENSITIVITY TO VARYING DATA ASSIMILATION METHODS IN A MESOSCALE MODEL. Wendell A. Nuss, NPS, Monterey, CA; and D. K. Miller

11.3 DOWNSCALING PRECIPITATION FIELDS OVER COMPLEX TERRAIN. Reinhold Steinacker, University of Vienna, Vienna, Austria; and M. Ratheiser, M. Dorninger, and F. Wimmer

11.4A SELECTING THE BEST FORECAST OUT OF AN ENSEMBLE BY USING SATELLITE IMAGE MATCHING FOR MAP IOP2B (FORMERLY PAPER P2.1). Arnold Tafferner, DLR/IPA, Wessling, Bavaria, Germany; and H. Mannstein, T. Paccagnella, C. Marsigli, A. Montani, and F. Nerozzi

11.5 PRECIPITATION FORECASTS VERSUS ANALYSIS FOR SELECTED IOP WET CASES. Manfred Dorninger, University of Vienna, Vienna, Austria; and R. Steinacker, M. Ratheiser, and I. Groehn

11.7 SIMULATIONS OF EXTREME PRECIPITATION EVENTS IN THE COLORADO ROCKY MOUNTAINS. William R. Cotton, Colorado State University, Ft. Collins, CO; and R. L. McAnelly and C. T. Ashby

SESSION 12: NUMERICAL MODELING AND DATA ASSIMILATION

12.1 EVALUATION OF THE GPS PW IMPACT USING THE 3DVAR FOR THE MAP IOPS. Claudia Faccani, CETEMPS, Coppito-L'Aquila, Italy; and R. Ferretti, D. Barker, R. Pacione, and C. Sciarretta

12.2 A NEW SUB-GRIDSCALE OROGRAPHIC DRAG PARAMETRIZATION FOR THE MET OFFICE UNIFIED MODEL. Stuart Webster, Met Office, Bracknell, Berks., United Kingdom

12.3 HYDROSTATIC VS. NONHYDROSTATIC SIMULATIONS IN A COMPLEX OROGRAPHY ENVIRONMENT. Raffaele Salerno, Centro Epson Meteo, Sesto San Giovanni, Italy; and A. Borroni

12.4 HIGH RESOLUTION DATA ASSIMILATION IN COMPLEX TERRAIN. Carol M. Ciliberti, NOAA and CIRP/Univ. of Utah, Salt Lake City, Utah; and J. D. Horel

12.5 BOUNDARY LAYER WIND FIELD OVER STEEP, SNOW COVERED, HIGH ALPINE TOPOGRAPHY. Norbert Raderschall, Swiss Federal Institue for Snow and Avalanche Research, Davos, Switzerland; and M. Lehning and J. Doorschot

12.6 ON THE ECMWF RE-ANALYSIS OF THE MAP SOP. Christian Keil, ECMWF, Reading, Berks., United Kingdom; and C. Cardinali

SESSION 13: GAP WINDS AND FOEHN I

13.1 FOEHN RESEARCH IN THE RHINE VALLEY DURING MAP: OBJECTIVES, CONCEPTS AND FIRST RESULTS (INVITED PRESENTATION). Hans Richner, ETH, Zurich, Switzerland; and R. Steinacker

13.2 FOEHN AND A STABLE AIRMASS IN THE RHINE VALLEY. Guillaume Beffrey, CNRM, Toulouse, France; and A. M. Dabas and G. Jaubert

13.3 UNSTATIONARY AND INHOMOGENEITY ASPECTS OF THE MAP IOP 12 SOUTH FOEHN EVENT IN THE RHINE VALLEY. Philippe Drobinski, Service d'Aéronomie, Paris, France; and C. Haeberli, E. Richard, B. Bénech, H. Berger, A. M. Dabas, P. H. Flamant, M. Furger, M. Lothon, and R. Steinacker

13.4 DYNAMIC AIRFLOW CHANNELLING EFFECTS IN BENT VALLEYS. Meinolf Kossmann, University of Canterbury, Christchurch, New Zealand; and A. P. Sturman

13.5 GAP WINDS FORCED BY FLOWS WITH SIMPLE VERTICAL STRUCTURE. Sasa Gabersek, University of Washington, Seattle, WA; and D. R. Durran

13.6 PHYSICALLY BASED FOEHN WIND DETECTION. Johannes M. Vergeiner, Univ. of Innsbruck, Innsbruck, Tyrol, Austria; and S. D. Mobbs and G. J. Mayr

13.7 ON THE IDENTIFICATION OF GAP FLOW FEATURES AND DYNAMICS FROM GROUND-BASED MEASUREMENTS. Georg J. Mayr, Institut für Meteorologie und Geophysik, University of Innsbruck, Innsbruck, Austria; and A. Gohm and J. M. Vergeiner

SESSION 14: GAP WINDS AND FOEHN II

14.1 APPLYING SINGLE-LAYER SHALLOWWATER THEORY TO GAP FLOWS OCCURRING IN THE BRENNER PASS REGION. Alexander Gohm, University of Innsbruck, Innsbruck, Austria; and G. J. Mayr

14.2 ON THE DYNAMICS OF GAP FLOW IN THE WIPPTAL ON 2021 OCTOBER 1999. Tomislav Maric, University of Washington, Seattle, WA; and D. R. Durran

14.3 THE SPATIAL AND TEMPORAL CHARACTERISTICS OF THE 30 OCTOBER 1999 GAP FLOW EVENT IN THE WIPPTAL. Louisa B. Nance, CIRES/ Univ. of Colorado, Boulder, CO; and R. M. Banta

14.4 AN INTERCOMPARISON OF LIDAR AND P3 WIND MEASUREMENTS IN THE WIPP VALLEY DURING MAP. Dale R. Durran, Univ. of Washington, Seattle, WA; and T. Maric, R. M. Banta, and L. S. Darby

14.5 MEASUREMENTS OF FLOW IN A CROSS-SECTION OF THE BRENNER PASS. Stephen D. Mobbs, University of Leeds, Leeds, West Yorkshire, United Kingdom; and S. J. Arnold, A. Gohm, and J. M. Vergeiner

14.6 STABLY STRATIFIED FLOW THROUGH A MOUNTAIN PASSIDEALISED SIMULATIONS. An Ross, University of Leeds, Leeds, West Yorkshire, United Kingdom; and S. B. Vosper and S. D. Mobbs

SESSION 15: ROTORS

15.1 OBSERVATIONS OF MOUNTAIN INDUCED ROTORS AND RELATED HYPOTHESES: A REVIEW (INVITED PRESENTATION). Joachim Kuettner, NCAR, Boulder, CO; and R. F. Hertenstein

15.2 SIMULATIONS OF ROTORS USING STEEP LEE-SLOPE TOPOGRAPHY. Rolf F. Hertenstein, Colorado Research Associates, Boulder, CO; and J. Kuettner

15.3 NUMERICAL SIMULATIONS OF LEE-WAVE ROTORS. Simon B. Vosper, Met Office, Bracknell, Berks., United Kingdom; and S. D. Mobbs

15.4 ROTOR GENERATION IN THE LEE OF THREE-DIMENSIONAL RIDGES. James D. Doyle, NRL, Monterey, CA; and D. R. Durran

■ POSTER SESSION 3: TOPOGRAPHIC FLOWS

P3.1 WHAT CAN WE LEARN OF SURFACE MESONETS IN FOEHN VALLEYS?. Reinhold Steinacker, Univ. of Vienna, Vienna, Austria; and M. Spatzierer, B. Chimani, C. Haeberli, M. Dorninger, and S. Tschannett

P3.2 USE OF WIND-TEMPERATURE PROFILER DATA TO INVESTIGATE FOEHN EPISODES DURING MAP-FORM. Siegfried Vogt, Institut f. Meteorologie u. Klimaforschung , Forschungszentrum, Karlsruhe, Germany

P3.3 MASS BUDGETS IN THE RHINE VALLEY DURING A FOEHN EVENT. Genevieve Jaubert, CNRM and Meteo France, Toulouse, France; and J. Stein

P3.4 ANALYSIS OF THE CONSTANT VOLUME BALLOON FLIGHTS ABOVE THE RHINE VALLEY DURING FOEHN EVENTS (MAP EXPERIMENT). Bruno Bénech, Laboratoire d'Aérologie, Toulouse, France; and M. Lothon and H. Berger

P3.5 FOEHN ANALYSIS IN THE RHINE VALLEY: FROM SYNOPTIC SCALE TO TURBULENCE ONE. Marie Lothon, Univ. Paul Sabatier, Campistrous, France; and A. Druilhet, B. Bénech, and B. Campistron

P3.6 GAP FLOWUPSTREAM AND DOWNSTREAM HYDRAULIC MODELS COMPARED WITH MAP DATA. Ignaz Vergeiner, Univ. of Innsbruck, Innsbruck, Austria; and G. J. Mayr, A. Gohm, and J. M. Vergeiner

P3.7 TEMPORAL EVOLUTION AND STRUCTURE OF GAP FLOW IN THE WIPP VALLEY ON 2 AND 3 OCTOBER 1999. Martin Weissmann, University of Innsbruck, Innsbruck, Austria; and R. Banta, G. Mayr, A. Gohm, and L. B. Nance

P3.8 PRESSURE GRADIENTS IN THE MAP BRENNER PASS DATA. Fred J. Kopp, South Dakota School of Mines and Technology, Rapid City, SD; and C. L. Hartsel and P. Smith

P3.9 THE FOEHN CYCLE DURING THE MAP-SOP: TYPICAL VERTICAL RAWINSONDE PROFILES BETWEEN MILANO AND MUNICH. Johannes M. Vergeiner, Univ. of Innsbruck, Innsbruck, Tyrol, Austria

P3.10 CASE STUDY OF THE NORTH FOEHN IN THE EISAKTAL DURING MAP. Peter L. Jackson, University of Northern British Columbia, Prince George, BC, Canada; and G. Geier

P3.11 PROPAGATION AND SPECTRAL CHARACTERISTICS OF FOEHN FLOW IN THE BRENNER PASS REGION. Stephen D. Mobbs, University of Leeds, Leeds, West Yorkshire, United Kingdom; and A. Gohm, G. J. Mayr, and J. M. Vergeiner

P3.12 ROTOR STREAMING, HYDRAULIC JUMPS AND FLOW SEPARATION IN THE FALKLAND ISLANDS. Stephen D. Mobbs, University of Leeds, Leeds, West Yorkshire, United Kingdom; and S. J. Arnold, M. K. Hill, S. B. Vosper, and A. M. Gadian

P3.13 TERRAIN-INDUCED WIND SHEAR DURING THE PASSAGE OF TYPHOON UTOR NEAR HONG KONG IN JULY 2001. S.Y. Lau, Hong Kong Observatory, Kowloon, Hong Kong; and C. M. Shun

P3.14 DYNAMIC AIRFLOW CHANNELLING OVER THE UPPER SNAKE RIVER PLAIN, IDAHO. Meinolf Kossmann, University of Canterbury, Christchurch, New Zealand; and C. D. Whiteman and X. Bian

P3.15 CHARACTERIZATION OF THE 28 JUNE 2001 MISTRAL EVENT DURING THE ESCOMPTE FIELD EXPERIMENT. Philippe Drobinski, Service d'Aéronomie, Paris, France; and O. Reitebuch, A. M. Dabas,

P. Delville, C. Werner, A. Delaval, C. Boitel, H. Hermann, E. Nagel, B. Romand, J. Streicher, S. Bastin, J. L. Caccia, P. Durand, and V. Guénard

P3.16 OBSERVATIONS AND MODELING OF THE MISTRAL WIND. Qingfang Jiang, Yale University, New Haven, CT; and R. B. Smith and J. D. Doyle

P3.17 EXPERIMENTAL AND NUMERICAL ANALYSIS OF A MISTRAL CASE DURING MAP EXPERIMENT IN RELATION WITH THE PV BANNER OBSERVATION. Aimé Druilhet, Laboratoire d'Aérologie, Toulouse, France; and B. Bénech, J. L. Caccia, E. Richard, B. Campistron, C. Flamand, M. Lothon, F. Saïd, C. Caminade, and V. Guenard

P3.18 TRANSIENT WAKE FORMATION BY MOUNTAINS OF A BAROTROPIC CYCLONE ON A BETA-PLANE. Hung-Cheng Chen, National Taiwan University, Taipei, Taiwan; and C.-C. Chu and C.C. Chang

P3.19 MOUNTAIN WAVES OVER THE HOHE TAUERN. James D. Doyle, NRL, Monterey, CA; and R. B. Smith

P3.20 COMPARISON OF MAP-SOP OBSERVATIONS WITH MODEL ANALYSIS AND FORECASTS OF GRAVITY WAVE BREAKING. Luca Ferrari, State Univ., Milan, Italy; and G. Frustaci

P3.21 CHARACTERIZATION OF WAVE ACTIVITY AND TURBULENCE IN THE LOWER TROPOSPHERE OVER THE SWISS ALPS. Michael Lehning, ETH, Davos, Switzerland; and J. Lindeman and S. B. Vosper

P3.23 LARGE-AMPLITUDE STRATOSPHERIC GRAVITY WAVES ABOVE SOUTHERN GERMANY. Thomas Birner, DLR German Aerospace Centre, Wessling, Germany; and D. A. Doernbrack

P3.24 DIAGNOSES AND NUMERICAL SIMULATIONS OF TURBULENCE IN THE VICINITY OF COASTAL TOPOGRAPHY. Douglas K. Miller, NPS, Monterey, CA; and D. L. Walters

P3.26 INTERACTION OF BOUNDARY LAYER FLOW AND GRAVITY WAVES OVER FORESTED HILLS. Adam Lea, University of Leeds, Leeds, West Yorkshire, United Kingdom; and S. B. Vosper, S. D. Mobbs, and B. Gardiner

P3.28 MODELING TURBULENT AIRFLOW IN MOUNTAINOUS REGIONS. John Lindeman, Univ. of Leeds, Leeds, United Kingdom; and S. D. Mobbs and S. B. Vosper

P3.29 CLIMATOLOGY OF THE SIERRA NEVADA MOUNTAIN-WAVE CLOUDS. Vanda Grubisic, DRI, Reno, NV; and S. Cardon

P3.31 CONTROL PARAMETERS FOR TRACK CONTINUITY AND DEFLECTION ASSOCIATED WITH TROPICAL CYCLONES OVER A MESOSCALE MOUNTAIN. Yuh-Lang Lin, North Carolina State University, Raleigh, NC; and S.-Y. Chen, C. M. Hill, and C.-Y. Huang

P3.34 SNEX: THE SNAEFELLSNES EXPERIMENT. Haraldur Olafsson, University of Iceland and the Icelandic Meteorological Office, Reykjavik, Iceland; and H. Sigurjonsson and H. Agustsson

P3.35 MOUNTAIN-WAVE INDUCED WINDSTORMS WEST OF WESTCLIFFE, COLORADO. Paul G. Wolyn, NOAA/NWSFO, Pueblo, CO; and T. Magnuson

P3.36 DATA QUALITY CONTROL OF SOP DATA IN MAP. Inga Groehn, Institute of Meteorology and Geophysics, Vienna, Austria; and R. Steinacker, M. Ratheiser, C. Haeberli, and W. Poettschacher

P3.37 NONLINEAR TOPOGRAPHIC WAVE GENERATION AT FINITE ROSSBY NUMBER. David J. Muraki, Simon Fraser Univ., Burnaby, BC, Canada; and C. Epifanio and C. Snyder

SESSION 16: DOWNSLOPE WINDSTORMS

16.1 FORCED DOWNSLOPE FLOW OVER THE WESTERN SIDE OF THE SUBTROPICAL ANDES. René D. Garreaud, Univ. of Chile, Santiago, Chile; and J. Rutllant

16.2A WSR-88D GROUND CLUTTER SIGNATURES ASSOCIATED WITH LEE-SLOPE WIND EVENTS (FORMERLY PAPER P3.33). Eric Thaler, NOAA/NWS, Boulder, CO; and L. B. Nance

16.3 OBSERVATIONS AND NUMERICAL SIMULATIONS OF A WAKE AND CORNER WINDS IN A STRONG WINDSTORM OVER ICELAND. Haraldur Olafsson, University of Iceland and Icelandic Meteorological Office, Reykjavik, Iceland; and M. A. Shapiro

16.4 RADAR OBSERVATIONS OF DOWNSLOPE FLOW AT MOUNT WASHINGTON. Brooks E. Martner, NOAA/ERL/ETL, Boulder, CO; and R. F. Reinking and R. M. Banta

■ SESSION 17: LEE-SIDE PHENOMENA

17.1 THE STRUCTURE OF AN ALPINE PV BANNER: OBSERVATIONS AND NUMERICAL SIMULATIONS. Christoph Schär, ETH, Zurich, Switzerland; and M. Sprenger, D. Lüthi, and R. Benoit

17.2 COMPARATIVE STUDY OF SECONDARY POTENTIAL VORTICITY BANNERS IN TWO MAP IOPS. Vanda Grubisic, DRI, Reno, NV

17.4 STAGNATION POINTS AND PV GENERATION IN MOIST STRATIFIED FLOW OVER ISOLATED TOPOGRAPHY. Juerg Schmidli, ETH, Zurich, Switzerland; and C. Schaer

17.5 A CASE STUDY OF FLOW SEPARATION. Volker Horlacher, Institute for Atmospheric Science, Leeds, United Kingdom; and S. D. Mobbs, S. B. Vosper, and S. J. Arnold

SESSION 18: MOUNTAIN WAVES: MAP

18.1 ANALYSIS OF A POTENTIAL VORTICITY STREAMER CROSSING THE ALPS DURING MAP IOP-15 ON 6 NOVEMBER 1999. Klaus P. Hoinka, DLR Oberpaffenhofen, Wessling, Germany; and G. Poberaj and E. Richard

18.2 SENSITIVITY STUDIES AND OBSERVATIONAL ANALYSIS OF THE SEPT 20 1999 LEE WAVE CASE DURING MAP. Gregory S. Poulos, Colorado Research Associates, Boulder, CO

18.3 GRAVITY WAVES OVER THE EASTERN ALPS DURING IOP-10 OF MAP: IN- SITU AND REMOTE SENSING DATA COMPARED WITH A HIGH-RESOLUTION SIMULATION. Hans Volkert, DLR Oberpfaffenhofen, Wessling, Germany; and C. Kiemle, J.-P. Chaboureau, and E. Richard

18.4 AIRCRAFT MEASUREMENTS AND SIMULATIONS OF MOUNTAIN WAVES OVER MONT BLANC. Samantha A. Smith, Met Office, Bracknell, Berks., United Kingdom; and A. S. Broad

■ SESSION 19: MOUNTAIN WAVES, WAVE BREAKING, AND TURBULENCE

19.0A INFLUENCE OF LATERAL SHEAR UPON MESOSCALE OROGRAPHIC FLOW Matthias Zillig, ETH, Zurich, Switzerland; and H. C. Davies

19.1 INTERNAL WAVE GENERATION IN THE LEE OF TOPOGRAPHY. Bruce R. Sutherland, University of Alberta, Edmonton, AB, Canada 19.2 EVIDENCE FOR INERTIA-GRAVITY WAVES FORMING POLAR STRATOSPHERIC CLOUDS OVER SCANDINAVIA. Andreas Dörnbrack, DLR Oberpfaffenhofen, Wessling, Germany; and T. Birner, H. Flentje, and A. Fix

19.3 THE IMPACT OF THE ATMOSPHERIC BOUNDARY LAYER ON MOUNTAIN FORCED GRAVITY WAVES. Adrian S. Broad, Met Office, Bracknell, Berks., United Kingdom

19.4 LARGE-SCALE FLOW RESPONSE TO SHORT MOUNTAIN WAVES BREAKING IN A ROTATING SHEAR FLOW. Francois Lott, CNRS, Paris, France

19.5 JUMP FORMATION AND VORTICES IN STRATIFIED FLOW PAST RIDGES. Craig Epifanio, Texas A&M University, College Station, TX; and R. Rotunno