PEPER Workshop at Aussois
15-19 december 2013

Organizers:
LSCE (P. Naveau), Météo-France (A. Ribes) and University Claude Bernard of Lyon (A-L. Fougères)

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1 Schedule

1.1 Practical information

1.1.1 Workshop venue

The Paul Langevin conference centre is located at an elevation of 1500 m, 7 km from the city of Modane with direct rail links to Paris and Turin. From the train station *Modane*, it is possible to take taxis or buses to go from Modane to Aussois. For details, please consult colloquium-at-aussois
For local information regarding the center, contact Christa Balzer Tel : +33 (0) 4 79 20 42 05 Fax : +33 (0) 4 79 20 30 44

1.1.2 Meals

8 :00-9 :00 Breakfast
12 :30-14 :00 Lunch
19 :30-20 :30 Diner

1.1.3 Discussions, collaborative research and recreational activities

Every day, the time period [14 :00-17 :00] is a free time to promote scientific discussions, starting new research paths and to enjoy the numerous walking trails and recreational activities around Aussois. Such informal discussions should foster new ideas and create collaborative links among attendees.

The conference will be held at the **Centre Paul-Langevin in Aussois**, which is a remote alpine village just 10km away from the railway station in Modane.

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Fig. 1.1 Maps of Aussois

1.2 Sunday (PEPER overview)

16 :00 Check-in begin (front desk at the Aussois center)
18 :00 Welcome drink
20 :30-21 :30 PEPER overview : Spatial design for heavy rainfall, *Theo Rietsch.*

1.3 Monday (Climate and weather extremes and weather generators)

All session will be chaired by the last speaker of his/her session, but the last talk will be chaired by the first speaker of the session.

1.3.1 Morning

9 :00-9 :30 Climate analogues and extremes, *Pascal Yiou*
9 :30-10 :00 Seasonal models for extremes, *Henning Rust*
10 :00-10 :30 Application of statistical analysis to understand land/atmosphere processes in temperature extreme events, *Benjamin Quesada*
10 :30-11 :00 Coffee break
11 :00-11 :30 Simulation, rare events and temperatures, *Thi-Thu-huong Hoang*
11 :30-12 :00 Deconstructing extreme events via synoptical patterns, *Julien Cattiaux*
12 :00-12 :30 Space-time modelling of extreme events, *Raphael Huser*

1.3.2 Afternoon

17 :00-17 :30 Stochastic Weather Generators and Switching AR - Application to temperature series, *Valérie Monbet*
17 :30-18 :00 Multi-site weather generators, *Marc Bourotte*
18 :00-18 :30 Coffee break
18 :30-19 :00 Model output statistics of wind forecasts: some examples of difficulties in forecasting extreme values, *Mickael Zamo*
19 :00-19 :30 Weather types and precipitation in mountainous regions, *Emmanuel Paquet*

1.3.3 Evening

20 :30-21 :15 Tales from the other side: extreme values and statistical consulting, *Jan Heffernan*

1.4 Tuesday (Statistics and Extreme events)

1.4.1 Morning

9 :00-9 :30 Max-stable processes at work, *Mathieu Ribatet*
9 :30-10 :00 Concentration inequalities for order statistics, *Maud Thomas*

10 :00-10 :30 Meta-elliptical extremes in finite and infinite dimension, *Thomas Opitz*
10 :30-11 :00 Coffee break
11 :00-11 :45 A Data-Adaptive Principal Component Analysis, *Hee-Seok Oh*
11 :45-12 :30 Inference of multivariate dependence structures, *Giulia Marcon*

1.4.2 Afternoon

17 :00-17 :30
17 :30-18 :00 Conditional Modelling of Extreme Wind Gusts by Bivariate Brown-Resnick Processes, *Marco Oesting*
18 :00-18 :30 Coffee break
18 :30-19 :00 Modelling extreme values of processes observed at irregular time step. Application to significant wave height, *Pierre Ailliot*
19 :00-19 :30 Conditional simulations of extremal of t process for fields of extreme precipitation, *Aurélien Bechler*

1.4.3 Evening

20 :30-21 :15 *Prediction of precipitation in Aussois. Are you game ?*

1.5 Wednesday (Extremes and the water cycle)

1.5.1 Morning

9 :00-9 :30 Statistical analysis of hydrological extremes, *Anne-Catherine Favre*
9 :30-10 :00 Bayesian non parametric modeling for extreme avalanches with censored and underestimated data, *Ophelie Guin*
10 :00-10 :30 Extreme Value for discrete random variables applied to Avalanches counts, *Pascal Sielenou*
10 :30-11 :00 Coffee break
11 :00-11 :30 Open problems in precipitation analysis, *Juliette Blanchet*
11 :30-12 :00 Censored data for hydrological extremes, *Anne Sabourin*
12 :00-12 :30 Towards spatially coherent statistical downscaling, *Jean-Philippe Vidal*

1.5.2 Afternoon

17 :00-17 :30 Regional Analysis of Annual Maximum Rainfall, *Julie Carreau*
17 :30-18 :00 Extremes in hydrology, *Benjamin Renard*

18 :00-18 :30 Coffee break
18 :30-19 :00 Avalanches risks, *Nicolas Eckert*
19 :00-19 :30 Clustering of Extremes for Time Series, *Olivier Wintenberger*

1.5.3 Evening

20 :30-21 :15 Gala diner

1.6 Thursday (Risk assessment, insurance)

1.6.1 Morning

9 :00-9 :30 Ruin probability and climate change (I), *Esterina Masiello*
9 :30-10 :00 Ruin probability and climate change (II), *Pierre Ribereau*
10 :00-10 :30 Multivariate risk in insurance portfolio, *Erwan Koch*
10 :30-11 :00 Coffee break
11 :00-12 :30 Closing remarks, identifying other research paths and new collaborations efforts.

2 Participants

	First name	Last name	email	Title
1	Pierre	Ailliot	pierre.ailliot@univ-brest.fr	Modelling extreme values of processes observed at irregular time step. Application to significant wave height
2	Aurélien	Bechler	aurelien.bechler@agroparistech.fr	Conditional simulations of extremal of t process for fields of extreme precipitation
3	Juliette	Blanchet	juliette.blanchet@ujf-grenoble.fr	Open problems in precipitation analysis
4	Marc	Bourotte	bourotte@avignon.inra.frr	Multi-site weather generators
5	Julie	Carreau	julie.carreau@univ-montp2.fr	Regional Analysis of Annual Maximum Rainfall
6	Julien	Cattiaux	julien.cattiaux@meteo.fr	Deconstructing extreme events via synoptical patterns
7	Romain	Chailin	romain.chailan@gmail.com	*
8	Nejib	Dalhoumi	dalhouminejib@yahoo.fr	*
9	Nicolas	Eckert	Nicolas.Eckert@irstea.fr	Regional Analysis of Annual Maximum Rainfall
10	Gilles	Nicolet	nicolet@math.univ-lyon1.fr	*
11	Esterina	Masiello	esterina.masiello@univ-lyon1.fr	Ruin probability and climate change (I)
12	Anne-Catherine	Favre	Anne-Catherine.Favre-Pugin@ense3.grenoble-inp.fr	Statistical analysis of hydrological extremes
13	Raphaël	De Fondeville	raphael.de_fondeville@mines-paristech.fr	*
14	Anne-Laure	Fougères	fougeres@math.univ-lyon1.fr	*
15	Ophelie	Guin	ophelie.guin@univ-lille3.fr	Bayesian non parametric modeling for extreme avalanches with censored and underestimated data
16	Jan	Heffernan	JAN@HEFFS.ORG.UK	Tales from the other side: extreme values and statistical consulting
17	Thi-Thu-huong	Hoang	thi-thu-huong.hoang@edf.fr	Simulation, rare events and temperatures
18	Raphael	Huser	raphael.huser@epfl.ch	Space-time modelling of extreme events
19	Erwan	Koch	erwan.koch@ensae.fr	Multivariate risk in insurance portfolio
20	Gwenaelle	Lebloa	gwenaelle.lebloa@meteo.fr	*
21	Giulia	Marcon	giulia.marcon@phd.unibocconi.it	Inference of multivariate dependence structures
22	Valérie	Monbet	valerie.monbet@univ-rennes1.fr	Stochastic Weather Generators and Switching AR - Application to temperature series
23	Philippe	Naveau	naveau@lsce.ipsl.fr	*
24	Gilles	Nicolet		*
25	Hee-Seok	Oh	heeseok.oh@gmail.com	A Data-Adaptive Principal Component Analysis
26	Marco	Oesting	oesting@math.uni-mannheim.de	Conditional Modelling of Extreme Wind Gusts by Bivariate Brown-Resnick Processes
27	Thomas	Opitz	opitz.thom@gmail.com	Meta-elliptical extremes in finite and infinite dimension
28	Emmanuel	Paquet	emmanuel.paquet@edf.fr	Weather types and precipitation in mountainous regions
29	Benjamin	Quesada	Benjamin.Quesada@lsce.ipsl.frt	Application of statistical analysis to understand land/atmosphere processes in temperature extreme events
30	Benjamin	Renard	benjamin.renard@irstea.fr	Extremes in hydrology
31	Mathieu	Ribatet	mathieu.ribatet@math.univ-montp2.fr	Max-stable processes at work
32	Aurélien	Ribes	aurelien.ribes@meteo.fr	*
33	Pierre	Ribereau	pierre.ribereau@univ-lyon1.fr	Ruin probability and climate change (II)
34	Theo	Rietsch	theo.rietsch1@gmail.com	Spatial design for heavy rainfall
35	Henning	Rust	henning.rust@met.fu-berlin.de	Seasonal models for extremes
36	Anne	Sabourin	annesab1@gmail.com	Censored data for hydrological extremes
37	Quentin	Sébille	sebille@math.univ-lyon1.fr	*
38	Pascal	Sielenou	pascal.sielenou@irstea.fr	Extreme Value for discrete random variables applied to Avalanches counts
39	Maud	Thomas	thomas@math.univ-paris-diderot.fr	Concentration inequalities for order statistics
40	Jean-Philippe	Vidal	jean-philippe.vidal@irstea.fr	Towards spatially coherent statistical downscaling
41	Olivier	Wintenberger	olivier.wintenberger@upmc.fr	Clustering of Extremes for Time Series
42	Pascal	Yiou	pascal.yiou@lsce.ipsl.fr	Climate analogues and extremes
43	Mickael	Zamo	michael.zamo@meteo.fr	Model output statistics of wind forecasts: some examples of difficulties in forecasting extreme values

3 Acknowledgments

3.1 The project PEPER

This workshop is part of the GIS climate (see next section) and it is financed with the project PEPER (Experimental design applied to the forecast of extreme climatic events at the regional scale).

The project aims at the following. Within the actual climate change context and the natural hazard insurance system reform in France, the question of how to define a natural hazard event plays a fundamental role. Reimbursements have to be taken by the state (via la Caisse Centrale de Réassurance) whenever the extreme event has a return period greater than 10 years. Today, such a decision is made subjectively. Defining an accurate criterion to classify an event into the natural hazard category is only possible if a network of measurements is sufficiently dense to allow an adequate probabilistic modeling of extreme events. For example, imagine that an insurance system is only responsible for events caused by strong winds (say, greater than 100 km/h). If someone demands to be reimbursed, this request has to be evaluated according to wind measurements recorded at nearby stations. The decision has to be made with an incomplete information and a probability approach is needed to take into account this uncertainty.

The goal of this project is to develop a statistical model to optimize the spatial design of a network of stations according to the distribution of extreme events. Two statistical research fields will be needed. Extreme Value Theory should provide the probabilistic structure to study extreme events. Spatial network design should bring the mathematical structure to optimize the network architecture. This project encompasses three scientific communities (math/stat, climate and economy/insurance) and this interdisciplinary effort should allow to develop novel network design tools in a probabilistic framework dedicated to extreme event analysis.

3.2 The GIS climat

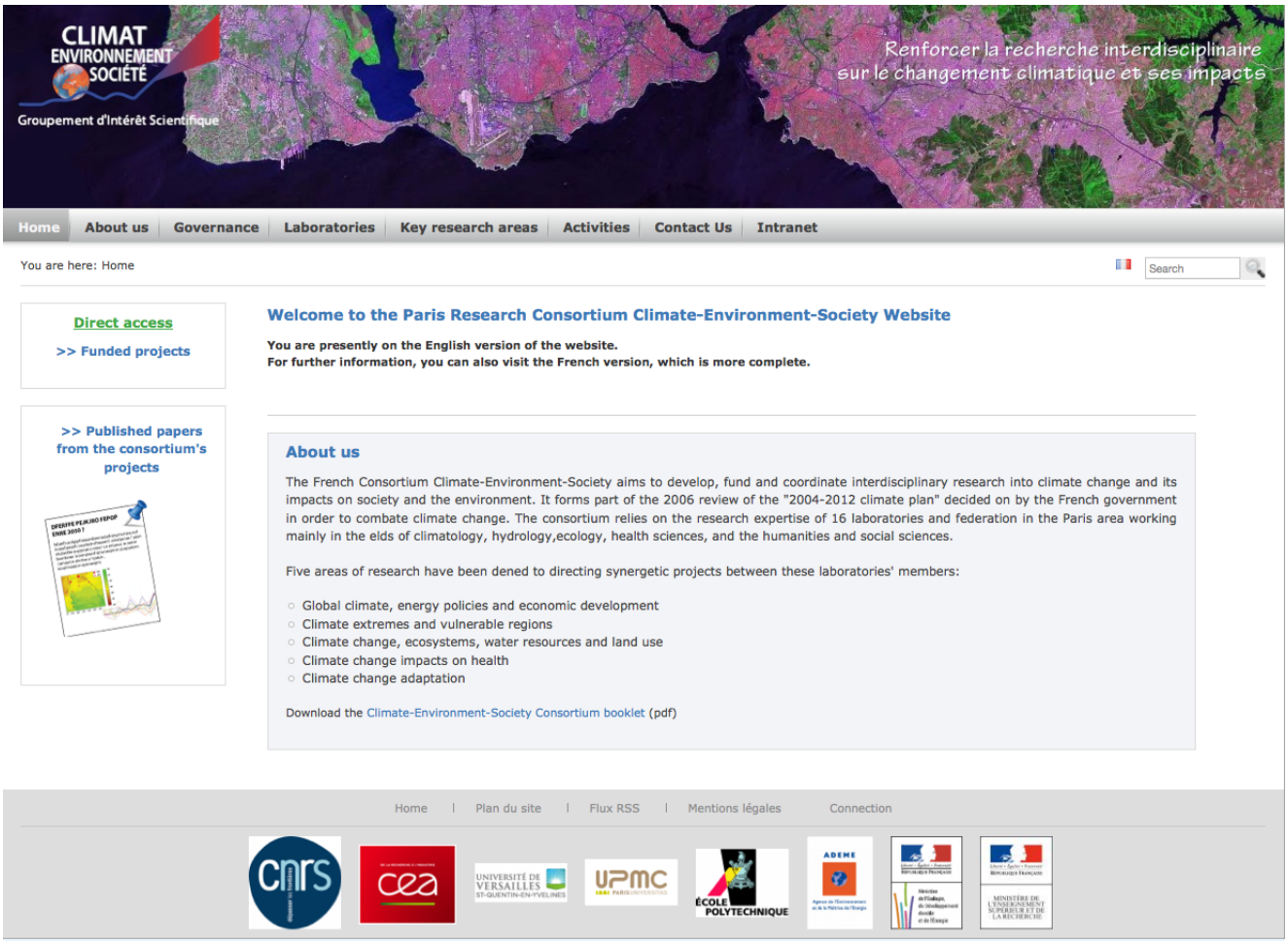

Fig. 3.1 http ://www.gisclimat.fr/en