GESTÃO DE PROJECTOS DE I&D - VISÃO GLOBAL DA CANDIDATURA (INVESTIGADORES)

(R&D PROJECTS - RESEARCHERS)

APPLICATION FORM OVERVIEW

Project reference
PTDC/MAT/112770/2009

Principal Investigator
Laurentius Franciscus Maria de Haan

1. Project description

Main Area
Matemática

Secondary area
Ambiente e Alterações Climáticas - Ambiente

Project title (in portuguese)
Extremos no espaço

Project title (in english)
Extremes in space

Requested funding
133.560,00€

Keyword 1 (in portuguese)
processos estocásticos

Keyword 1 (in english)
stochastic processes

Keyword 2 (in portuguese)
teoria de valores extremos

Keyword 2 (in english)
extreme value theory

Keyword 3 (in portuguese)
avaliação de risco

Keyword 3 (in english)
risk evaluation

Keyword 4 (in portuguese)
indicadores ambientais espaciais

Keyword 4 (in english)
spatial environmental indicators

Starting date
01-01-2011

Duration in months
36

2. Institutions and their roles

Principal Contractor

Fundação da Faculdade de Ciências da Universidade de Lisboa (FFC/FC/UL)

Campo Grande - Edificio C7 -1º Piso
1749-016Lisboa

Participating Institution

(Void)

Research Unit

Centro de Estatística e Aplicações (CEA/FC/UL)

Faculdade de Ciências, BL C2, Piso 2 - Campo Grande
1749-016Lisboa

Additional Research Unit

(Void)

Host Institution

Faculdade de Ciências da Universidade de Lisboa (FC/UL)

Rua Ernesto de Vasconcelos - Edifício C5 - Campo Grande
1749-016Lisboa

3. Scientific Component

3.1 Summary

3.1.a Executive Summary (in Portuguese)

Quando em localizações de relativa proximidade no espaço, os valores de precipitação apresentam-se fortemente correlacionados. Quando se percorrem registos de precipitação elevada, a depedência mútua pode ser bastante diferente. A teoria de processos max-estáveis fornece a base de sustentação para a modelação da dependência em níveis elevados do processo. Neste elenco podem ser abordadas questões que se relacionam com a precipitação ao longo do espaço, como é o caso da precipitação extrema numa dada região. Os processos max-estáveis são vantajosos, por exemplo, no estudo de problemas relativos à concentração de elementos tóxicos no ar ou na água, mas também na abordagem de problemas sobre formações geológicas. Apesar da teoria fundamental dos processos max-estáveis se encontar já bem sedimentada, alguns dos seus apectos básicos permancem pouco esclarecios. Assim sendo, propomos aprofundar o conhecimento sobre estes aspectos no sentido de tornar a teoria mais adaptável a aplicações.

3.1.b Executive Summary (in English)

Rainfall at nearby locations is strongly correlated. The mutual dependence can be quite different during heavy rainfall. The theory of max-stable processes offers a framework for modeling dependence at higher levels of the process. Using this framework questions about spatial rainfall, like extreme rainfall in a certain area, can be addressed. Max-stable processes are useful for – for example – problems on the amount of toxic elements in the air or water but also for problems about geological formations. The basic theory is well established. However some basic aspects are not well understood. We propose to gain more insight into those aspects in order to make the theory more suitable in view of applications.

3.2 Technical Description

3.2.1. Literature Review

Max-stable processes form the latest off-spring of extreme value theory. Extreme value theory starts with studying the limit distribution of the largest order statistic but in fact it turns out to be an intelligent way to model the (right) tail of a distribution function in view of estimating the probability of a rare event – an event that has rarely occurred in the past or maybe never so that one can not estimate this probability in a non-parametric way. Extreme value theory has been developed first in the one-dimensional situation (probabilistic part around 1940, statistical part around 1985), then in the higher-dimensional situation (probabilistic part in the 1970's, statistical part around 1990) and finally in the context of stochastic processes. Recent books on extreme value theory are Beirlant, Goegebeur, Segers and Teugels (2004), de Haan and Ferreira (2006). Max-stable processes are obtained as limits of point-wise maxima of i.i.d. stochastic processes. They serve as models for extremes in space such as extreme rainfall in a certain area. The basic theory has been well established by now. The structure of such processes can be expressed in three ways and all of them are useful. 1.A characterization using a family of deterministic functions called spectral functions (de Haan 1984, de Haan and Pickands 1986, Resnick and Roy 1991). Special cases have been considered in view of applications by R.L. Smith (1991) and de Haan and Pereira (2006). 2.A characterization using an auxiliary stochastic process of a quite general nature, a "spectral" process (Brown and Resnick 1977, Schlather 2002, de Haan and Ferreira 2006, p. 307 and Kabluchko, Schlather and de Haan 2009). This structure has been used in Buishand, de Haan and Zhou (2008) on the total rainfall in some area on one day. 3.Representation in terms of a "spectral measure" on a certain function space (Giné, Hahn and Vatan 1990). This structure has been applied also in a rainfall problem by Coles (1993), Coles and Tawn (1996) and Ferreira, de Haan and Zhou (2009). Convergence to a max-stable process has been considered by de Haan and Lin (2001,2003) and Einmahl and Lin (2006). Various special models have been proposed and applied by Zhang and R. Smith (2004, 2009) and Shamseldin , Smith, Sain, Mearns and Cooley (2009). A different approach to spatial extremes relying on finite-dimensional extreme value theory and an unobserved spatial process has been used in a Bayesian context by Cooley, Nychka and Naveau (2006), Fawcett and Walshaw (2006) and Gelfand and Sang(2009). REFERENCES: A.A. Balkema and L. de Haan (1974). Residual life at great age. Ann. Probab. 2: 792-804. J. Beirlant, Y. Goegebeur, J. Segers and J. Teugels (2004). Statistics of extremes: theory and applications. Wiley, New York. S.M. Berman (1992). Sojourns and extremes of stochastic processes. Wadsworth and Brooks, Pacific Grove. B. Brown and S.I. Resnick (1977). Extreme values of independent stochastic processes. J. Appl. Probab. 14: 732-739. A. Buishand, L. de Haan and C. Zhou (2008). On spatial extremes: With application to a rainfall problem. Ann. Appl. Statist. 2: 624-642. S.G. Coles (1993). Regional modelling of extreme storms via max-stable processes. J. Roy. Statist. Soc. Ser. B. 55: 797-816. S.G. Coles and J. Tawn (1996). Modelling extremes of the areal rainfall process. J. Roy. Statist. Soc. Ser. B. 58: 329-347. D. Cooley, D. Nychka and Ph. Naveau (2006). Bayesian spatial modeling of extreme precipitation return levels. J. Amer. Statist. Assoc. 102: 824-840. R. Davis and Th. Mikosch (2008): Extreme value theory for space-time processes with heavy-tailed distributions. Stoch Proc Appl 118, 560-584. J.H.J. Einmahl and T. Lin (2006). Asymptotic normality of extreme value estimators on C[0,1]. Ann. Statist. 34: 469-392. L. Fawcett and D. Walshaw (2006). A hierarchical model for extreme wind speeds. Applied Statistics 55: 631-646. M. Ferreira and L. Canto e Castro (2009): Modeling rare events through a pRARMAX process. Tech report CEAUL, Univ Lisbon. A.E. Gelfand and H. Sang (2009): Hierarchical modeling for extreme values observed over space and time. Submitted. E. Giné, M.G. Hahn and P. Vatan (1990). Max-infinitely divisible and max-stable sample continuous processes. Probab. Related Fields. 87: 139-165. L. de Haan (1984). A spectral representation for max-stable processes. Ann Probab. 12: 1194-1204. L. de Haan and A. Ferreira (2006). Extreme value theory: an introduction. Springer, New York. L. de Haan and T. Lin (2001). On convergence towards an extreme-value distribution in C[0,1]. Ann. Probab. 29: 467-483. L. de Haan and T. Lin (2003). Weak consistency of extreme value estimators in C[0,1]. Ann. Statist. 31: 1996-2012. L. de Haan and T.T. Pereira (2006). Spatial extremes: models for the stationary case. Ann. Statist. 34: 146-168. L de Haan and J. Pickands (1986). Stationary min-stable processes. Probab. Theory Related Fields. 72: 477-492. L. de Haan and C. Zhou (2009). Extreme residual dependence for random vectors and processes. (people.few.eur.nl/ldehaan/) H. Hult and F. Lindskog (2004). Extremal behaviour of regularly varying stochastic processes. Stoch. Process. and Appl. 115: 249-274. H. Hult and F. Lindskog (2006). Extremal behaviour of stochastic integrals driven by regularly varying Lévy processes. Ann. Probab. 35: 309-339. Z. Kabluchko, M. Schlather and L. de Haan (2009) Stationary max-stable fields associated to negative definite functions. Annals of Probability, 37, 2042, 2065. C. Lantuejoul (2005). Quelques commentaires sur deux modèles maxstables. Centre de Géostatistique, Ecole des Mines. Fontainebleau. G. Mathéron (1972). Leçons sur les functions aleatoires d'ordre 2. Centre de Géostatistique, Ecole des Mines. Fontainebleau. J. Pickands (1975). Statistical inference using extreme order statistics. Ann. Statist. 3: 119-131. The second part of the list of references can be found in the section "plano e métodos / plan and methods".

3.2.2. Plan and Methods

The long term objective is to clarify some intriguing aspects of the theory of extremes of stochastic processes in order to make the theory more suitable for applications. Here is a description of the proposed research. 1.The paper Kabluchko, Schlather and de Haan (2009) has extended the result of Brown and Resnick (1977) in many directions. It offers a wide variety of theoretical models. We are planning to study characteristics of the various models, adapt them and develop further theoretical models in such a way that they can be applied to real world situations with similar characteristics. 2.Devise kriging methods for max-stable processes that is, find an intelligent way to guess the rest of the max-stable process in some area if there are observations only in a restricted number of places in that area. This is an interesting and important problem. The techniques for max-stable processes ought to be quite different from those for non-extreme processes. Our techniques seem very useful here. Problems of this kind are important in geostatistics (Mathéron 1972, Wackernagel 2003); see e.g. Lantuéjoul (2005). 3.Covariates are usually introduced in the context of maximum likelihood methodology for parametric models. But it is also possible to deal with them in a semi-parametric framework. We plan to work this out and apply the method. A particular case to be considered is a trend in time or space. 4.The connection between the representation using deterministic spectral functions and the one using spectral stochastic processes is easy from a theoretical point of view but not in a concrete situation. For example, what is the stochastic representation of a moving maxima process (this seems an accessible question)? Or the other way around: what is the spectral function representation of the Brown- Resnick process where the auxiliary process is the exponential martingale of Brownian motion? This seems a tough but important question. We expect to gain much by solving problems of this kind. 5.A similar question is even more intriguing in the context of stationary max-stable processes. As explained above, the representation in terms of spectral functions involves – in the stationary case – a group of transformations called pistons (linear L_ (1) [0,1] isometries). Up to now only the simplest case of a shift has been explored. We plan to study those semi-groups (flows) in order to uncover other interesting special cases. Background information can be found in the papers by Rosinski (1995), this is not on max-stable processes but on the related class of alpha-stable processes, and Stoev (2007). 6.Davis and Mikosch (2008) showed that the process (the formula did not appear when copying) where the Zi's are i.i.d. regularly varying stochastic processes and the i deterministic functions (with certain conditions) is in the domain of attraction of a max-stable process for all t. We consider the process (the formula did not appear when copying) where c is a deterministic function, the Ut are i.i.d. random fields (with certain conditions) and the Zt are i.i.d. regularly varying stochastic processes. We intend to show that this process is in the domain of attraction of a max-stable process for all t (cf. M. Ferreira and L. Canto e Castro 2009). [This text with complete formulas can be found in the attachment folder 9] 7. "Excursion stable processes". It has been mentioned before that extreme value theory starts with the study of the limit distribution of the largest order statistic but that in fact it boils down quickly to studying the tail of a distribution function. This has been formalized in a limit theorem involving "generalized Pareto distributions" (GPD, cf. Balkema and de Haan 1974 and Pickands 1975). A similar but more involved approximation holds in finite-dimensional space (see e.g. Rootzén and Tajvidi 2006). A proposal for a "GPD" process (called "excursion stable process") has been presented on page 326 of de Haan and Ferreira (2006). It is very simple: {YV(s)} with P{Y larger than x} = 1/x for x larger or equal to one, Y and V independent, V has continuous sample paths, EV(s) = 1 for all s and E sup _(s element of I) V(s) finite for each bounded interval I. We intend to study the role that such processes can play in applications of extreme value theory as well as to study theoretical properties and the relation to the max-stable process with the same spectral process. REFERENCES (second part; the first part can be found in the section literature review) S.I. Resnick and R. Roy (1991). Random USC functions, max-stable processes and continuous choice. Ann. Appl. Probab. 1: 267-292. H. Rootzén and N. Tajvidi (2006). The multivariate generalized Pareto distribution. Bernoulli 12: 917-930. J. Rosinski (1995). On the structure of stationary stable processes. Ann. Probab. 23: 1163-1187. M. Schlather (2002). Models for stationary max-stable random fields. Extremes 5: 33-44. E.C. Shamseldin, R.L. Smith, S.R. Sain, L.O. Mearns and D. Cooley (2008): Downscaling extremes: a comparison of extreme value distributions in point-source and gridded precipitation data. Submitted R. L. Smith (1990). Max-stable processes and spatial extremes. Unpublished notes. S. Stoev (2008). On the ergodicity and mixing of max-stable processes. Stoch Proc Appl 118, 1679-1705. H. Wackernagel (2003). Multivariate Geostatistics. Springer, New York. Z. Zhang and R.L Smith (2009): On the estimation and application of max-stable processes. (UNC Chapel Hill) Submitted.

3.2.3. Tasks

Task list (2)

Task denomination	Start date	End date	Duration	Person * months
Point 7 of the "planos e métodos"	01-01-2011	31-07-2012	19	38

Task description and Expected results
Point 7 of the "planos e métodos" will be addressed by Luisa Canto e Castro and Marta Ferreira. All the other points will be addressed by the entire group as a whole.

Members of the research team in this task
Luísa da Conceição dos Santos do Canto e Castro de Loura; Marta Susana Ribeiro Ferreira;

Task denomination	Start date	End date	Duration	Person * months
points 1-5 and 7 of the research plan	01-01-2011	31-12-2013	36	216

Task description and Expected results
This coherent research plan will be executed jointly by all members of the project.We intend to begin working on points 1 and 2. We hope to finish them in the first year. Meanwhile we start thinking about the deeper problems 4 and 5. In the second year we shall work on point 3, but also 4 and 5. In the last year we should be able to bring point 7 to a good end.

Members of the research team in this task
Ana Maria Santos Ferreira Gorjão Henriques; Cláudia Margarida Pedrosa Neves; Juanjuan Cai; Laurentius Franciscus Maria de Haan; Luísa da Conceição dos Santos do Canto e Castro de Loura; Marta Susana Ribeiro Ferreira;

3.2.4. Project Timeline and Management

3.2.4.a Description of the Management Structure

The coordinator is responsible for the progress in all areas. There will be regular meetings of the entire group to monitor progress in all points and discuss the individual contributions.

3.2.4.b Milestone List

Date	**Milestone denomination**
01-09-2012	workshop

Description

In the second half of the second year there will be a workshop where we present the results obtained by the members of the group and where colleagues from abroad will be invited to present their results in the same area.

3.2.4.c Timeline

File with the name "timeline.pdf" at 9. Attachments (if exists)

3.3. Bibliographic References

Reference	Year	Publication
Ferr.Canto	2009	M. Ferreira and L. Canto e Castro (2009): Modeling rare events through a pRARMAX process. Tech report CEAUL, Univ Lisbon.
Ferr.dH.Zhou	2009	A. Ferreira, L de Haan and C. Zhou: Exceedance probability of the integral of a stochastic process
Ka.Schl.dH	2009	Z. Kabluchko, M. Schlather and L. de Haan (2009) Stationary max-stable fields associated to negative definite functions. Annals of Probability, 37, 2042, 2065.
Bu.dH.Zhou	2008	A. Buishand, L. de Haan and C. Zhou (2008). On spatial extremes: With application to a rainfall problem. Ann. Appl. Statist. 2: 624-642.
dH.Ferr.	2006	L. de Haan and A. Ferreira (2006). Extreme value theory: an introduction. Springer, New York.
dH.Lin2	2003	L. de Haan and T. Lin (2003). Weak consistency of extreme value estimators in C[0,1]. Ann. Statist. 31: 1996-2012.
dH.Lin1	2001	L. de Haan and T. Lin (2001). On convergence towards an extreme-value distribution in C[0,1]. Ann. Probab. 29: 467-483.

3.4. Past Publications

Reference	Year	Publication
dH.Lin1	2001	Ann. Probab. 29: 467-483
dH.Ferr	2006	Springer, New York
Bu.dH.Zhou	2008	Ann Appl Statist, 2: 624-642
Ka.Schl.dH	2009	Ann. Probab, 37, 2042-2065
Ferr.dH.Zhou	2009	people.few.eur.nl/ldehaan/

4. Research team

4.1. Members list

Name	Role	Academic degree	%time	Core CV
Laurentius Franciscus Maria de Haan	Inv. Responsável	DOUTORAMENTO	50	✓
Ana Maria Santos Ferreira Gorjão Henr...	Investigador	DOUTORAMENTO	50	✓
Cláudia Margarida Pedrosa Neves	Investigador	DOUTORAMENTO	25	X
Juanjuan Cai	Investigador	MESTRADO	50	X
Luísa da Conceição dos Santos do Cant...	Investigador	DOUTORAMENTO	50	✓
Marta Susana Ribeiro Ferreira	Investigador	DOUTORAMENTO	50	X

(Curriculum vitae for each research team member is available by clicking on the corresponding name)

Total: 6

5. Funded projects

Funded projects list

Reference	Title	Status
PTDC/MAT/64924/2006	extremos espaciais (EXES)	Em curso

(Details for each project are available by clicking on the corresponding reference)

Total: 1

6. Expected indicators

Expected output indicators

Description	2010	2011	2012	2013	2014	Total
A - Publications						
Books	0	0	0	0	0	**0**
Papers in international journals	0	2	2	2	0	**6**
Papers in national journals	0	1	1	1	0	**3**
B - Communications						
Communications in international meetings	0	4	4	4	0	**12**
Communications in national meetings	0	4	4	4	0	**12**
C - Reports	0	3	3	3	0	**9**
D - Organization of seminars and conferences	0	3	3	3	0	**9**
E - Advanced training						
PhD theses	0	0	1	0	0	**1**
Master theses	0	0	0	0	0	**0**
Others	0	0	0	0	0	**0**
F - Models	0	0	0	0	0	**0**
G - Software	0	0	0	0	0	**0**
H - Pilot plants	0	0	0	0	0	**0**
I - Prototypes	0	0	0	0	0	**0**
J - Patents	0	0	0	0	0	**0**
L - Other						
	0	0	0	0	0	**0**
	0	0	0	0	0	**0**
	0	0	0	0	0	**0**

Scientific activity spreading actions

We intend to organize one or two public lectures during the three years of the project. Perhaps there is an opportunity to react to some event in the press.

7. Budget

Principal Contractor

Fundação da Faculdade de Ciências da Universidade de Lisboa

Description	2010	2011	2012	2013	2014	Total
Human resources	0,00	0,00	0,00	0,00	0,00	**0,00**
Missions	0,00	14.500,00	17.500,00	14.500,00	0,00	**46.500,00**
Consultants	0,00	10.500,00	20.500,00	10.500,00	0,00	**41.500,00**
Service procurement and acquisitions	0,00	4.000,00	10.000,00	3.000,00	0,00	**17.000,00**
Patent registration	0,00	0,00	0,00	0,00	0,00	**0,00**
Adaptation of buildings and facilities	0,00	0,00	0,00	0,00	0,00	**0,00**
Overheads	0,00	6.400,00	10.160,00	5.700,00	0,00	**22.260,00**
TOTAL CURRENT EXPENSES	**0,00**	**35.400,00**	**58.160,00**	**33.700,00**	**0,00**	**127.260,00**
Equipment	0,00	3.000,00	2.800,00	500,00	0,00	**6.300,00**
TOTAL	**0,00**	**38.400,00**	**60.960,00**	**34.200,00**	**0,00**	**133.560,00**

Participating Institutions

No Participating Institution has been registered for this project.

Global budget

Description	2010	2011	2012	2013	2014	Total
Human resources	0,00	0,00	0,00	0,00	0,00	**0,00**
Missions	0,00	14.500,00	17.500,00	14.500,00	0,00	**46.500,00**
Consultants	0,00	10.500,00	20.500,00	10.500,00	0,00	**41.500,00**
Service procurement and acquisitions	0,00	4.000,00	10.000,00	3.000,00	0,00	**17.000,00**
Patent registration	0,00	0,00	0,00	0,00	0,00	**0,00**
Adaptation of buildings and facilities	0,00	0,00	0,00	0,00	0,00	**0,00**
Overheads	0,00	6.400,00	10.160,00	5.700,00	0,00	**22.260,00**
TOTAL CURRENT EXPENSES	**0,00**	**35.400,00**	**58.160,00**	**33.700,00**	**0,00**	**127.260,00**
Equipment	0,00	3.000,00	2.800,00	500,00	0,00	**6.300,00**
TOTAL	**0,00**	**38.400,00**	**60.960,00**	**34.200,00**	**0,00**	**133.560,00**

Finance plan

Description	2010	2011	2012	2013	2014	Total
Financiamento solicitado à FCT Requested funding	0,00	38.400,00	60.960,00	34.200,00	0,00	**133.560,00**
Financiamento próprio Own funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Outro financiamento público Other public-sector funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Outro financiamento privado Other private funding	0,00	0,00	0,00	0,00	0,00	**0,00**
Total do Projecto Total of the project	**0,00**	**38.400,00**	**60.960,00**	**34.200,00**	**0,00**	**133.560,00**

8. Budget rationale

8.1. Human resources rationale

(Void)

8.2. Missions rationale

Type	No. of participations
Participação em congressos	52
Venue	**Cost (€)**
several	46.500,00

Rationale for requested funding

The line of research described in the proposal is becoming a topic of great interest internationally. It is of prime importance to maintain good international ties. Since much research is going on in Northern Europe, traveling in both directions is essential. We have budgeted 1 visit to the US (3000 euros in 2012), 6 visits in EU each year (7*1500 euros) and 10 trips inside Portugal each year (10*400 euros). Moreover we plan to organize an international workshop with 20 participants (18,000 euros).

8.3. Consultants rationale

Full name

Holger Drees

Institution

University of Hamburg, Germany

Project phase	Cost (€)
4 visits of 1 week	6.000,00

Rationale for requested funding

Professor Drees is a specialist in stochastic processes connected with extremes and a former co-author. His visits are essential to the project.

Web page where the consultant's CV can be accessed

www.math.uni-hamburg.de/home/drees/

Full name

John Einmahl

Institution

University of Tilburg, The Netherlands

Project phase	Cost (€)
4 visits of one week	6.000,00

Rationale for requested funding

Professor Einmahl is a specialist in statistical problems connected with extremes for stochastic processes and a former co-author. His visits are essential to the project.

Web page where the consultant's CV can be accessed

center.uvt.nl/staff/einmahl/

Full name

Holger Rootzen

Institution

Chalmers university, Sweden

Project phase	Cost (€)
1 visit of 1 week	1.500,00

Rationale for requested funding

As explained in 4.2 international cooperation is of prime importance to this particular project. To give an idea we list some people with whom we cooperated in the past on similar projects and who are currently thinking about research problems similar to the ones in our proposal. Professor Rootzen is editor of the journal Bernoulli and expert in the field. Once again: the list of consultants is preliminary and depends on availability and current focus.

Web page where the consultant's CV can be accessed

www.cs.chalmers.se/~rootzen/

Full name

Jonathan Tawn

Institution

University of Lancaster

Project phase	Cost (€)
2 visit of 1 week	3.000,00

Rationale for requested funding

As explained in 4.2 international cooperation is of prime importance to this particular project. To give an idea we list some people with whom we cooperated in the past on similar projects and who are currently thinking about research problems similar to the ones in our proposal. Professor Tawn is a specialist in applications of extremes, in particular in spatial problems. Once again: the list of consultants is preliminary and depends on availability and current focus.

Web page where the consultant's CV can be accessed

www.maths.lancs.ac.uk/~tawn/

Full name
Juerg Huesler
Institution
University of Bern
Project phase | **Cost (€)**
visit of one week | 1.500,00
Rationale for requested funding
As explained in 4.2 international cooperation is of prime importance to this particular project. To give an idea we list some people with whom we cooperated in the past on similar projects and who are currently thinking about research problems similar to the ones in our proposal. Professor Huesler is the Editor of the Journal Extremes and a renowned specialist in non-stationarity in extremes. Once again: the list of consultants is preliminary and depends on availability and current focus.
Web page where the consultant's CV can be accessed
http://www.imsv.unibe.ch/content/staff/personalhomepages/huesler/index_eng.html

---

Full name
Liang Peng
Institution
Georgia Institute of Technology, Atlanta, USA
Project phase | **Cost (€)**
visit of 3 weeks | 4.000,00
Rationale for requested funding
Professor Peng is a specialist in optimal statistical procedures for extremes in finite- and infinite-dimensional space and a fomer co-author. His visits are essential for the project.
Web page where the consultant's CV can be accessed
www.math.gatech.edu/users/peng

Full name
Martin Schlather
Institution
University of Goettingen, Germany
Project phase | **Cost (€)**
2 visits of 1 week | 3.000,00
Rationale for requested funding
As explained in 4.2 international cooperation is of prime importance to this particular project. To give an idea we list some people with whom we cooperated in the past on similar projects and who are currently thinking about research problems similar to the ones in our proposal. Professor Schlather has developed spatial models for extremes that seem quite useful. Once again: the list of consultants is preliminary and depends on availability and current focus.
Web page where the consultant's CV can be accessed
www.stochastik.math.uni-goettingen.de/~schlather

Full name
Chen Zhou
Institution
De Nederlandsche Bank/ Erasmus University Rotterdam
Project phase | **Cost (€)**
4 visits of one week | 6.000,00
Rationale for requested funding
Zhou is knowledgeable in several ares of extremes in particular financial applications that is one of the main area of applications.
Web page where the consultant's CV can be accessed
http://www.dnb.nl/onderzoek/onderzoekers/persoonlijke-paginas/auto86981.jsp

---

Full name
Zakhar Kabluchko
Institution
University of Ulm, Germany
Project phase | **Cost (€)**
2 visits of one week | 3.000,00
Rationale for requested funding
Kabluchko is an expert in (Gaussian) stochastic processes including max-stable processes and a co-author.
Web page where the consultant's CV can be accessed
http://www.uni-ulm.de/mawi/mawi-stochastik/mitarbeiter/zakhar-kabluchko.html

---

Full name
Anne-Laure Fougeres
Institution
University of Lyon1, France
Project phase | **Cost (€)**

2 visits of one week	3.000,00

Rationale for requested funding

Ms Fougeres is one of the most promising young researchers in our field. It is very useful to visits in both directions.

Web page where the consultant's CV can be accessed

math.univ-lyon1.fr/~fougeres/englishal.html

Full name

Stilian Stoev

Institution

University of Michigan, USA

Project phase	Cost (€)
2 visits of one week.	3.000,00

Rationale for requested funding

Stoev is specialized in alpha-stable and max-stable stochastic processes. His expertise is very valuable for the project.

Web page where the consultant's CV can be accessed

www.stat.lsa.umich.edu/~sstoev/

Full name

Philippe Naveau

Institution

laboratoire des sciences du climat et de l'environnement, Paris, France

Project phase	Cost (€)
1 visit of one week	1.500,00

Rationale for requested funding

Climate research is one of the areas where extreme value is important.It is good to be able to have time for discussions with Dr Naveau.

Web page where the consultant's CV can be accessed

http://www.lsce.ipsl.fr/Pisp/44/philippe.naveau.html

8.4. Service procurement and acquisitions

Type	Cost (€)
secretariat, administrative and technical services, current expenses, books, workshop	17.000,00

Rationale for requested funding

administrative services related with the project and the workshop; Tecnhical assistance; software; renting equipment to the workshop; books; documentation to the workshop; minor expenses such as paper, toner, photocopies; Conference rooms in a hotel for the workshop; other current expenses directly related to the execution of the project; other cost related with the organization of the workshop.

8.6. Equipment rationale

8.6.1 Available equipment

Equipment type	Manufacturer	Model	Year
Laptop	Sony	vaio	2008
printer	HP	J4580	2009
laptop	VAIO	VGN-FE41S	2007

8.6.2. New equipment requested

Equipment type	Manufacturer	Model	Cost (€)
4 PC	Dell/ compaq / other	---	6.000,00

Rationale for requested funding

The PCs are needed for the computer-intensive applications and simulations connected with the project.

Equipment type	Manufacturer	Model	Cost (€)
2 printers	HP	...	300,00

Rationale for requested funding

two printer for the whole group is the minimum requirement.

8.7. Patent registration

(Void)

8.8. Adaptation of buildings and facilities

(Void)

9. Attachments

Name	Size
Annex Plan & Methods.pdf	78Kb
timeline.pdf	47Kb

quarta-feira, 21 de Janeiro de 2015