



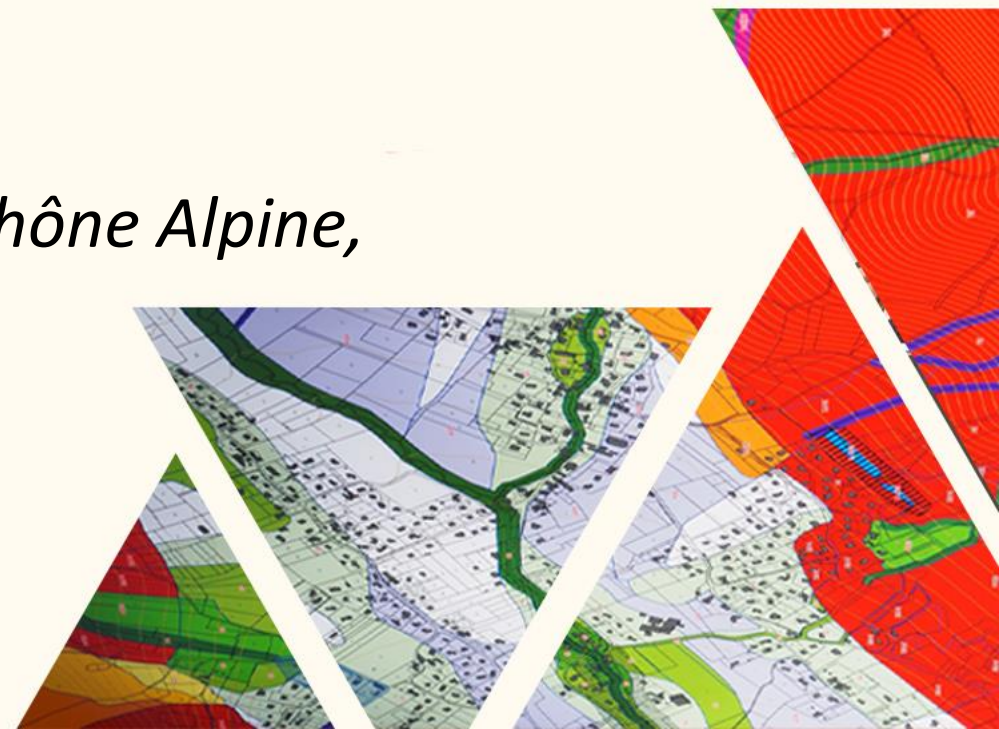
(Infra)structures vulnerability to risks

kkk
Vulnérabilité des Ouvrages aux Risques

Local research network

*Structure fédérative de recherche Rhône Alpine,
2003-2020*


Julien Baroth





(Infra)structures vulnerability to risks

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Vulnérabilité des Ouvrages aux Risques (**VOR**)

- 1. Definition of the network**
 2. Some results
 3. From VOR to RISK@UGA
- 



(Infra)structures vulnerability to risks

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Vulnérabilité des Ouvrages aux Risques

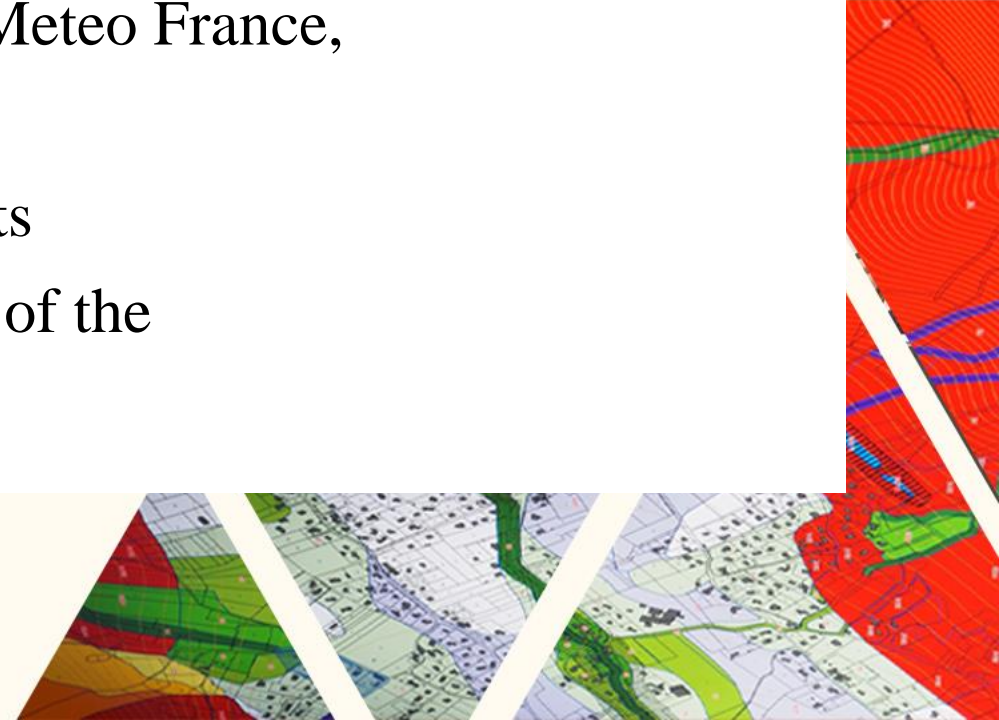
- *created in 2003 by Jacky Mazars (former 3SR director)*
- *11 laboratories from Lyon, Grenoble, Chambéry:*
 - Laboratoire Sols Solides Structures Risques (INPG/UJF/CNRS)
 - Laboratoire Institut des Sciences de la Terre (UJF/CNRS/LCPC/IRD)
 - Unité de Recherche Erosion Torrentielle, Neige et Avalanches (IRSTEA Grenoble)
 - Laboratoire de Glaciologie et Géophysique de l'Environnement (UJF/CNRS)
 - Laboratoire de Tribologie et Dynamique des Systèmes (ECL)
 - Laboratoire de Génie Civil et d'Ingénierie Environnementale (INSA Lyon)
 - IFSTTAR / CEREMA Lyon
 - Laboratoire Optimisation de la Conception et Ingénierie de l'Environnement (UdS)
 - Laboratoire de Mathématiques de Chambéry (CNRS/UdS)
 - Centre d'Etude de la Neige (Météo-France/CNRS)
 - Laboratoire Environnements Dynamiques et Territoires de Montagne (CNRS/UdS).



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Vulnérabilité des Ouvrages aux Risques

- GIS, then federation (« Structure fédérative de recherche »)
 - Initially 2 universities (UJF Grenoble, Savoie Chambéry),
+ Grenoble INP, CNRS, INSA Lyon, Meteo France,
+ Cemagref (ex-INRAE)
 - L. Baillet (Isterre) & S. Grange (3SR) co-pilots
 - End decided in 2019 by UGA-GINP because of the
creation of RISK@UGA
- 

Scientific challenges

- i) Promote collaboration between the Engineering, Earth Sciences communities, with mathematicians, numerical engineers and experimentalists in Grenoble, Lyon and Chambéry.
- ii) Support research aimed at
 - preventing and protecting against natural hazards
 - a better understanding of natural phenomena and their impact on structures,
 - design tools to analyze the vulnerability of infrastructures,
 - contribute to the development of tools for risk managers..



Rockfall



Avalanche



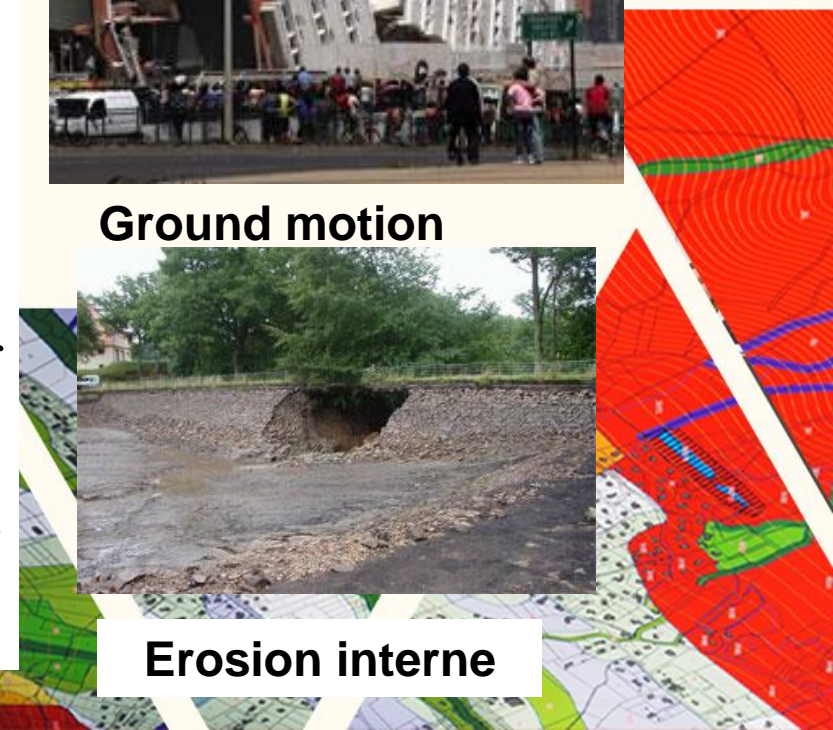
Slope stability



Ground motion




Erosion interne





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Examples of pluridisciplinary projects (2016-2017)

Modeling experiments with DEM parebloc decrans in a forest context
INSA Lyon (LGCIE) – INRAE(Irstea) Grenoble

Instability of the Gugla (Valais) and Dérochoir (Mont-Blanc) rock glaciers
UGA (Isterre + 3SR) – UdS (EDYTEM)

Qualification of the reinforcement of an unstable rock column - Gorges de la Bourne
UGA (ISTerre) - SAGE/ADRG

Geo-Permafrost
UGA (ISTerre) - UdS (EDYTEM)

Piles under combined cyclic loading
UGA (3SR) – INSA Lyon (LGCIE)

SEISMOHYGLAC: SEISmic MOonitoring of glacier HYdrology, GLACier basal sliding and glacier fracturing at Argentiere and Tacconnaz (Mont Blanc).
UGA (IGE + ISTerre)

Scientific animation

Scientific days or meetings

- Annual budget between 20 and 75 k€
- around ~10 % of the total budget
- scientific workshops attended by an average of 50 to 100 people (researchers, doctoral students, companies, local authority staff, etc.). Open to all and free of charge for participants, they are widely disseminated to operational partners (La Sage, IMSRN, Géolithe, Myotis, CD38, CD73, RTM, EGIS, etc.).
- between 2011 and 2018, 19 workshops

Transfer and expertise for users

Training workshops

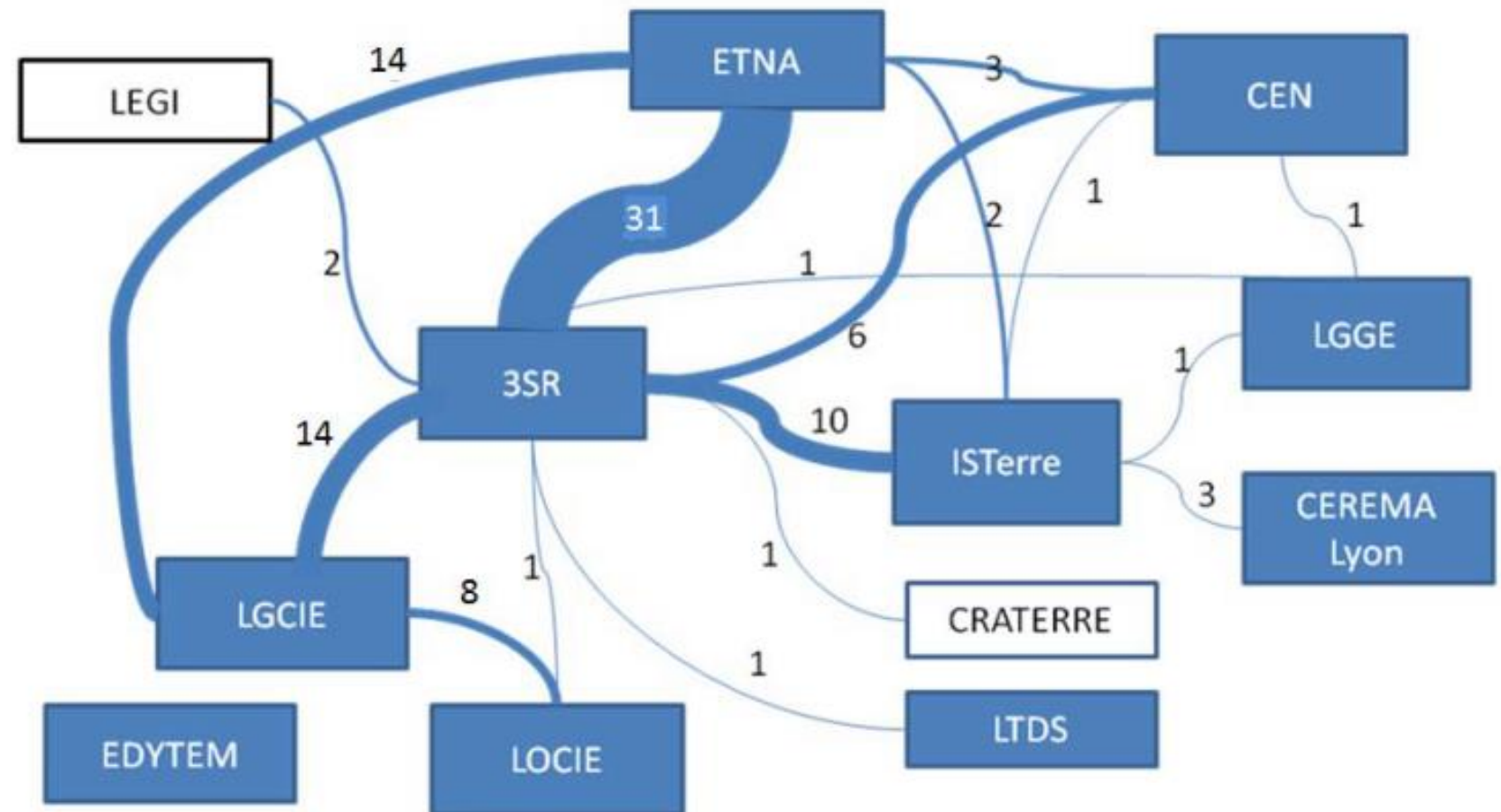
Between 2011 and 2019, VOR has co-organized and financially supported 13 scientific events: thematic schools, doctoral schools and workshop. This financial support commits the organizers to allowing doctoral students from VOR laboratories to participate free of charge.

Examples:

- 1st Workshop YADE Yet Another Discrete Element code (7-9/7/2014 à Grenoble)
- RAP Journées du réseau accélérométrie permanent, 2016
- JFMS Journées Fiabilité des Matériaux et Structures, 2012, 2014
- Montain and Science since 2016
- Colloque Techniques d'Imagerie pour la Caractérisation des Matériaux et des Structures du Génie Civil, 2017, 3SR Grenoble

Pluridisciplinary projects: structuring impact

- Each project must gather at least 2 laboratories to be financed
- Priority is given to new collaborations
- All projects are presented by their main(s) author(s).
- A scientific day is organized every year / 2 veras to present results of researchs.



Collaboration between different laboratories through the number of international articles (A) between 2009 and 2014

Strengths

- multidisciplinary scientific animation
- scientific production (articles, conferences...)
- low financial supports (< 6k€) allowing larger projects (ANRs...)
- projects multi sites
- mutualisation of experimental means

Weaknesses...


- decrease of financial supports (Lyon / Chambéry)
- CDP Risk started in 2017...

...that was also an opportunity



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2019 :

decision from UGA-GINP to stop VOR in 2020 to focus on Risk@UGA

2020 :

Last call for projects called « Impulsion » , in collaboration with Risk@UGA

Only 4 laboratories from VOR in Risk@UGA

Les 11 laboratoires appartenant à la SF VOR sont basés sur les campus de Grenoble, Lyon et Chambéry :

- Laboratoire Sols Solides Structures Risques (INPG/UJF/CNRS)
- Laboratoire Institut des Sciences de la Terre (UJF/CNRS/LCPC/IRD)
- Unité de Recherche Erosion Torrentielle, Neige et Avalanches (IRSTEA Grenoble)
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Risk@UGA

4/11

but members of VOR contributed to create another regional network « I-Risk »



I-RISK



RISK Summer School 2024

Collaborative regional platform in the field of natural gravitational risks: landslides, block falls, torrential floods...

Animated by the competitive cluster Infra2050 (Indura), composed of economic, technical and scientific members from Rhône-Alpes area (Lyon, Grenoble, Chambéry...)

Members: Can, BRGM, Engineerisk, Geolithe, Geophyconsult, GINP, Hydrokarst INDURA, INRAe, INSA Lyon, NGE Fondations, UGA, USMB...



VOR (2003-2020): Conclusions

- A breeding ground for transdisciplinary research, relevant and effective to the needs of environmental engineering
- Played a structuring role at both local and regional levels
- These multi-laboratory projects have been instrumental in setting up larger operations (ANR, European projects, POIA, C2ROP, I-Risk...).
- Increasingly promoting and transferring research to the socio-economic world

Remains a source of inspiration : **2024-25**

New call for projects also called « Impulsion » by the cluster

« Engineering assets at risk »

“Structures, infrastructures, systèmes à risque”

Joint call for projects "Impulsion" 2025

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- Aim: support **interdisciplinary mini-projects** developing new collaborations and/or exploring innovative approaches in the areas covered by the UGA Risk Institute.
- The maximum amount of support will be limited to **€4,000** per project.
- Projects involving an innovative collaborative study may include a request for operating, equipment or mixed support.

Two types of support are available:

- Support for **innovative collaborative studies**
 - Support for inter-laboratory co-supervised **internship projects** or hosting internships for masters students from other sites.
-
- **Eligibility:** application from at least 2 teams from RISK Project partner laboratories, as part of the activities of the Structures and Infrastructures, Systems at Risk cluster.
 - The project must be part of an interdisciplinary collaborative approach to the cluster's themes.
 - The project will have an advantage if it has not previously received funding from the RISK CDP: thesis, master's degree or previous IMPULSION project.