

Mountaineering facing climate change effects

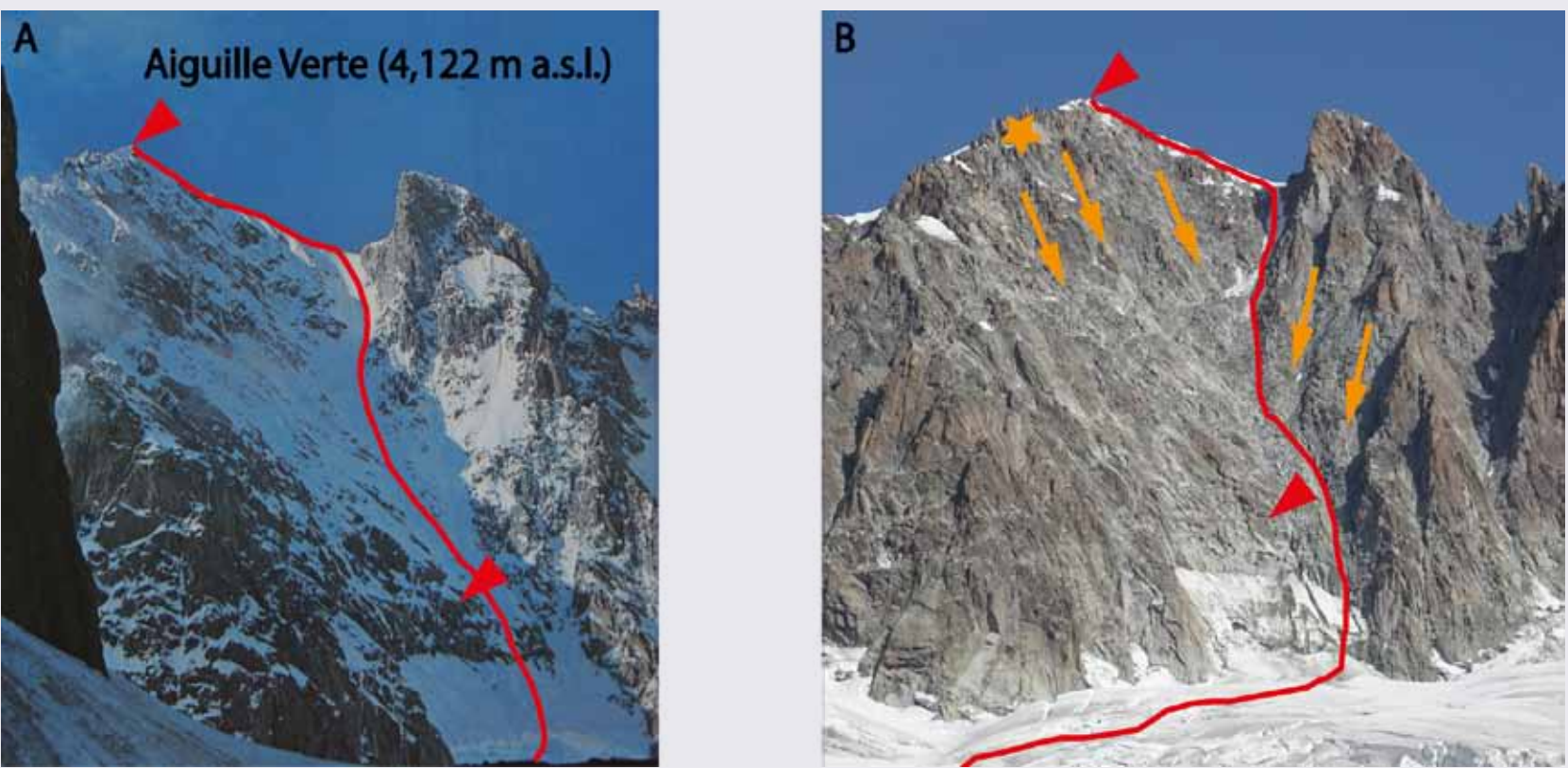
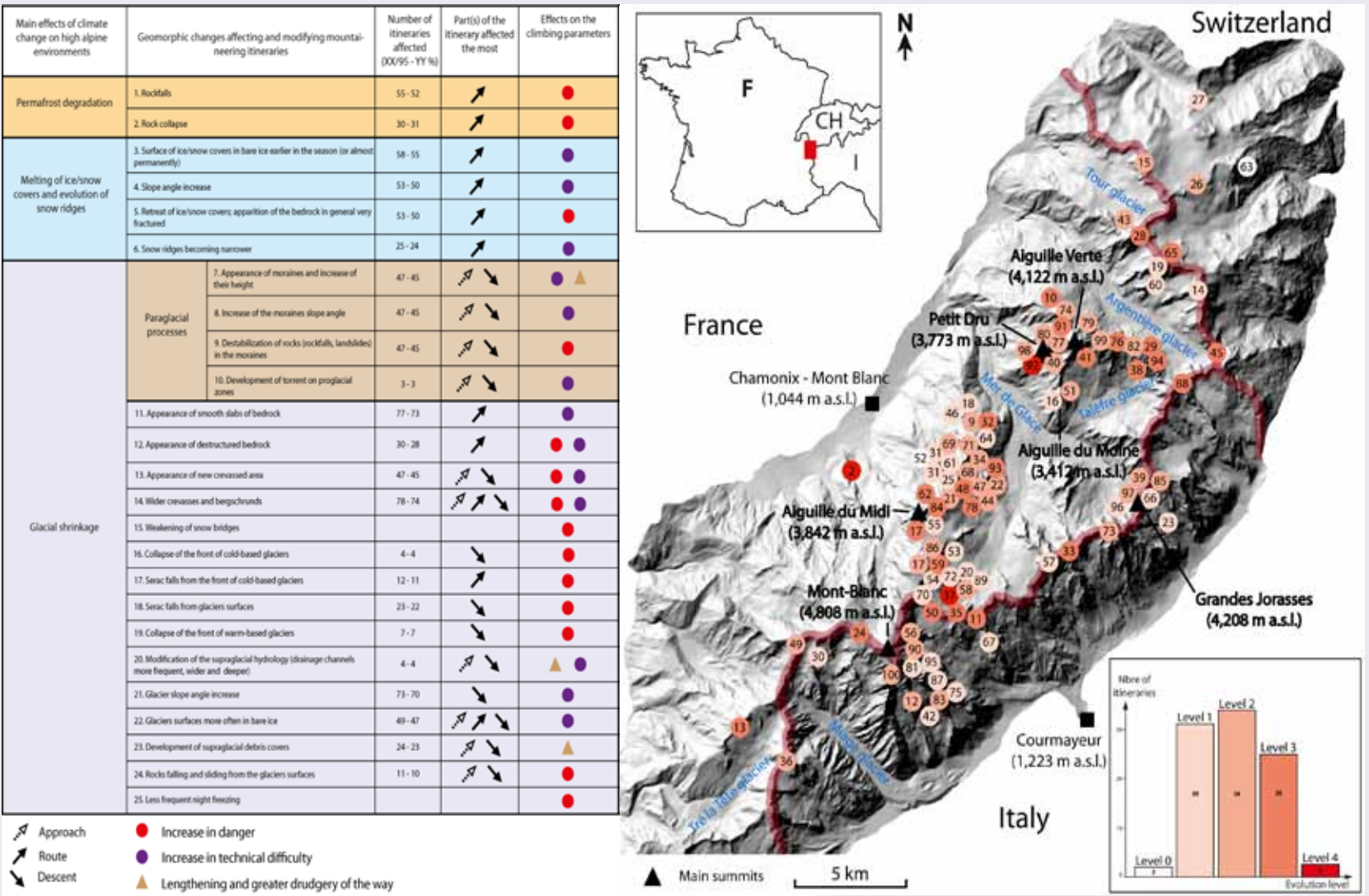
Evolution of mountaineering routes and adaptation strategies developed by French Alpine guides

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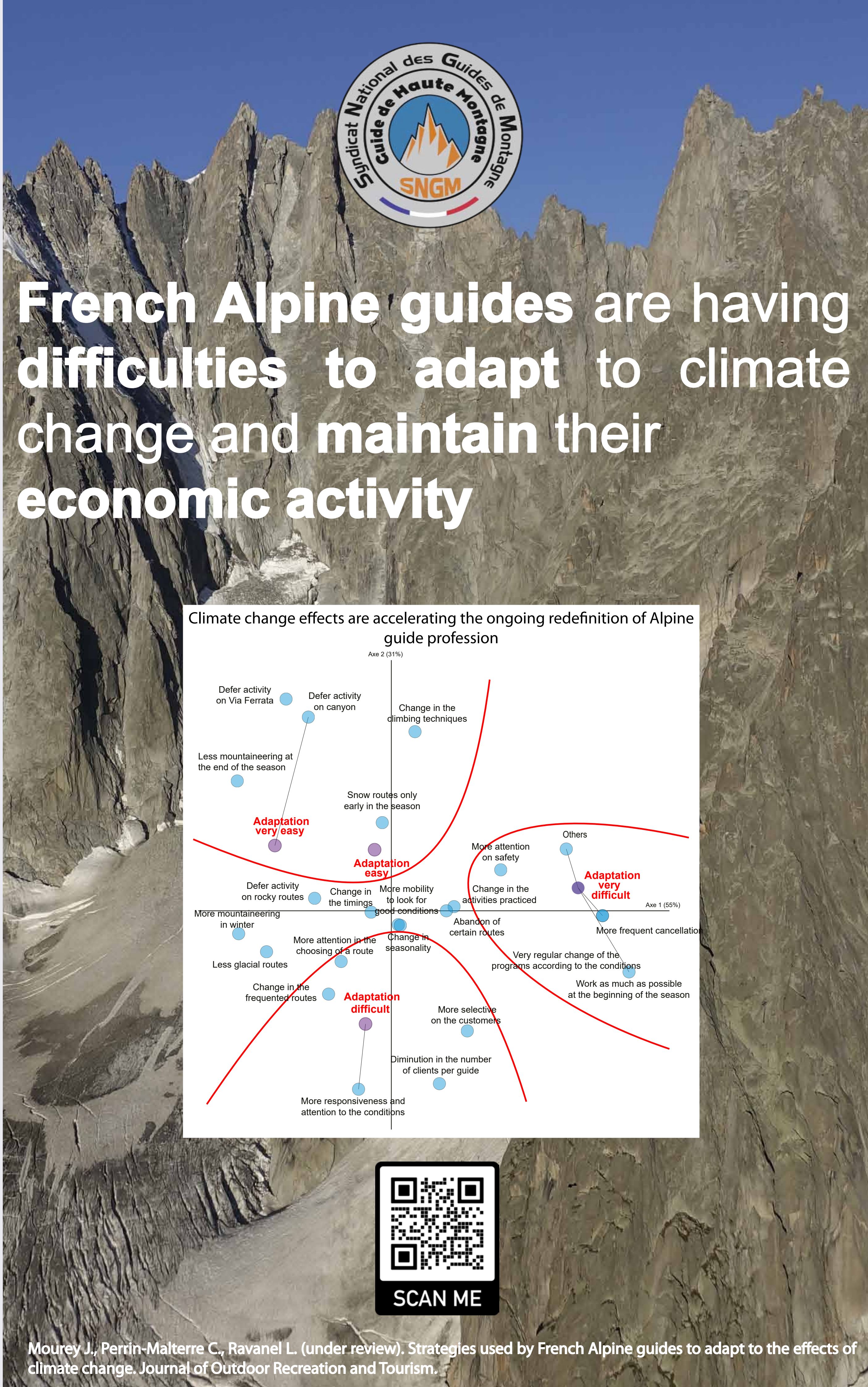
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Mountaineering, a more dangerous and difficult practice because of climate change

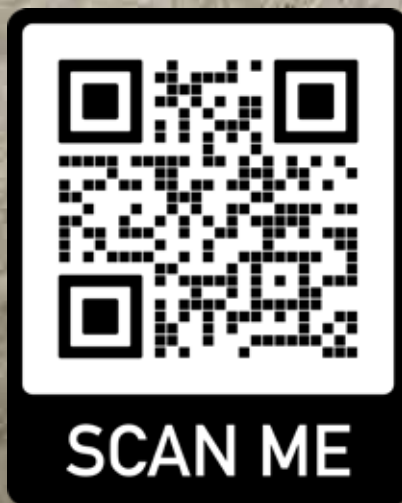
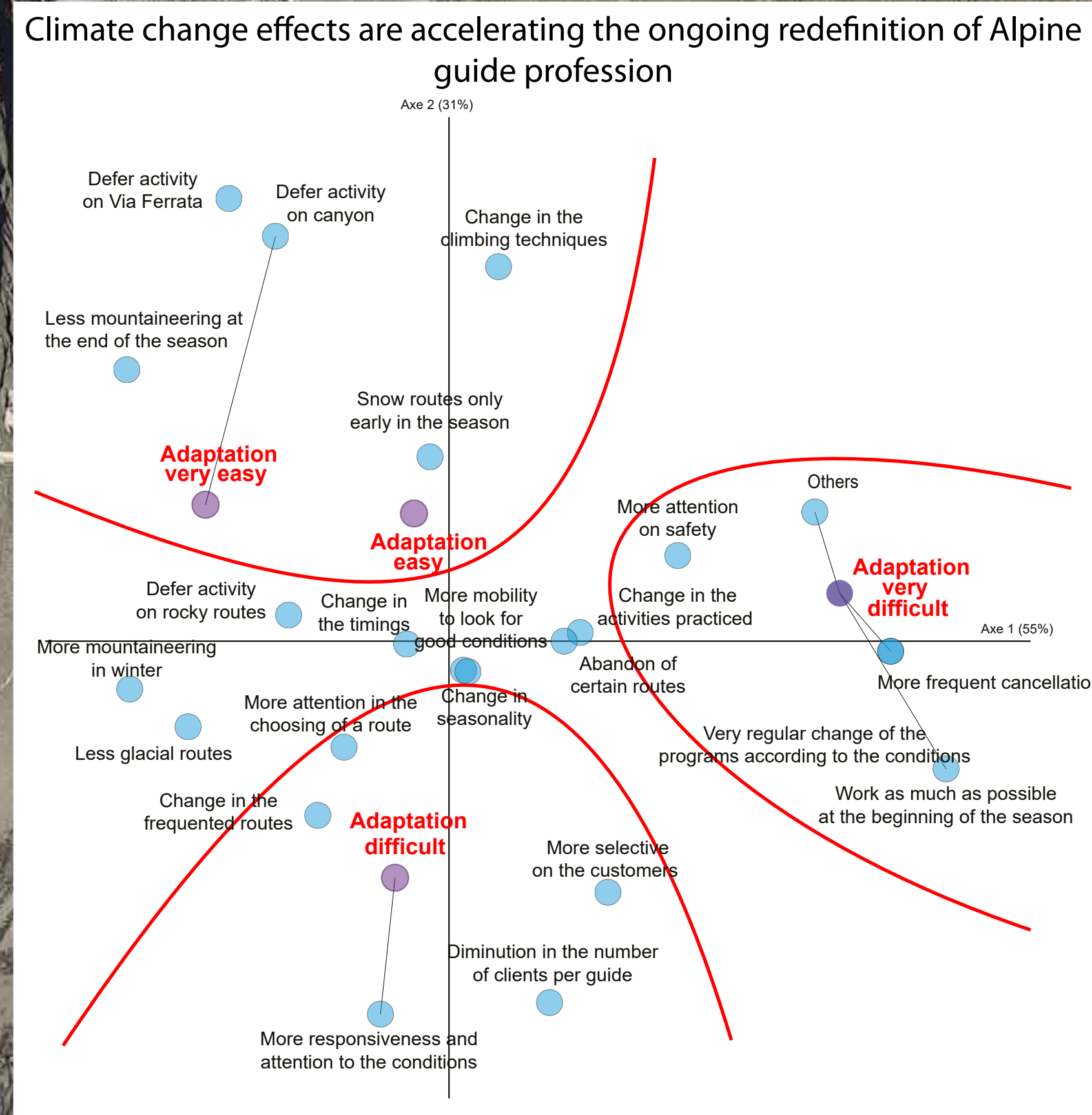
Mourey J. *et al.* (2019). Effects of climate change on high Alpine mountain environments: Evolution of mountaineering routes in the Mont Blanc massif (Western Alps) over half a century. *Arctic, Antarctic and Alpine Research*, 51:1, 176-189. DOI: 10.1080/15230430.2019.1612216



A: Situation at the end of the 1960s.
B: Situation at the end of August 2017. The ice/snow cover in the couloir has undergone a very significant reduction which has exposed fractured bedrock, leading to frequent rockfalls (orange arrows). The orange star indicates the point where a 22,000 m³ rockfall released in 2015.



French Alpine guides are having difficulties to adapt to climate change and maintain their economic activity



Mourey J., Perrin-Malterre C., Ravanel L. (under review). Strategies used by French Alpine guides to adapt to the effects of climate change. *Journal of Outdoor Recreation and Tourism*.



Discussion

- **33 adaptation methods identified**, grouped in 5 main strategies

Adaptive strategies	Respondents Nber	Respondents (%)
Changes in the seasonality of the work		43.7
Snow routes only early in the season	36	17.5
Change in the mountaneering seasonality	32	15.5
Work as much as possible at the beginning of the season	9	4.4
Less mountaineering at the end of the season	7	3.4
More mountaineering in winter	5	2.4
Avoid mountaineering when the 0°C isotherm is too high	1	0.5
Change in the activities practiced		34.5
Defer activity on rocky routes	37	18
Less glacial routes	14	6.8
Change in the activities practiced	7	3.4
Defer activity on canyon	6	2.9
Defer activity on Via Ferrata	4	1.9
Selection of short routes	2	1
Defer activity on the ski	1	0.5
Paying more attention and being more reactive to conditions		31
More attention in the choosing of a route	29	14.1
More responsiveness and attention to the conditions	11	5.3
Change in the climbing timings	9	4.4
More frequent cancellation	8	3.9
Very regular change of the programs according to the conditions	4	1.9
Always prepare a plan B - C	2	1
More anticipation of the conditions	1	0.5
Change in the location of work		30.2
Change in the frequented routes	25	12.1
Abandon of certain routes	20	9.7
More mobility to look for good conditions	9	4.4
Change in the mountaneering location of practice	3	1.5
Change of ice-schools location	2	1
Chose of routes high in altitude	2	1
Chose of routes low in altitudes	1	0.5
Change in the manner of climbing and the climbing techniques employed		10.1
Diminution in the number of clients per guide	5	2.4
More attention on safety	5	2.4
More selective on the customers	4	1.9
Change in the climbing techniques	4	1.9
Take more risks	2	1
Re-equipment	1	0.5

- **2 categories of guides** are distinguished : one has **difficulties in adapting** (50 %) while the other faces the challenge **with greater ease**

- Those who mainly offer **traditional mountaineering** are **less adaptable** than those who are **diversifying** and offer activities **outside high mountain** environments

- **Alpine guides have the possibility to adapt**, but this implies a **redefinition of their work** they are often **not comfortable with**.