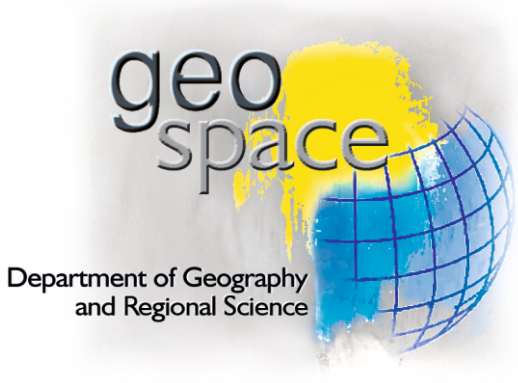




Interannual variability of rock glacier surface velocities and its relationship to climatic conditions on a decadal scale: Some insights from the European Alps



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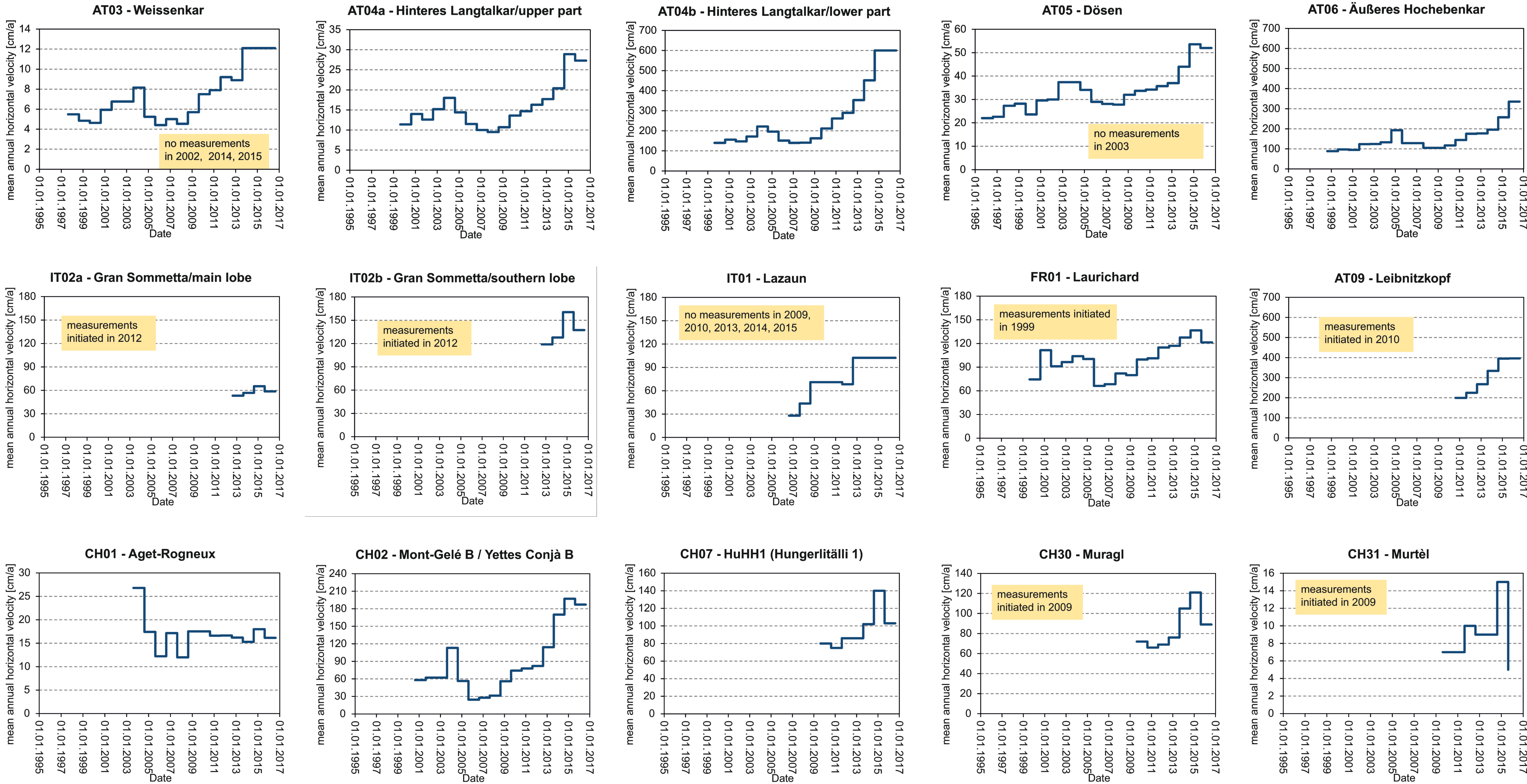
Abstract: The monitoring of surface velocities at active rock glaciers has a long tradition in the European Alps with first surveys in the 1920s. Since the 1990s velocity monitoring activities have been substantially expanded and partly institutionalized. At this poster we present and compare annual rock glacier velocity data from 35 rock glaciers in Austria (6), France (1), Italy (2) and Switzerland (26) spanning a time period of up to 2 decades. Results indicate a strong correlation between the studied rock glaciers and hence climatic forcing. This underlines the importance of rock glaciers as climate indicator.



Take-home message: In general, rock glacier surface velocities in the European Alps have been rather low during the 1980s and 1990s and reached a first peak in 2003/04 followed by a drastic drop until c.2007/08. Since then rock glacier surface velocities increased again with new velocity records in 2015/16 superior to the first peak around 2003/04. These creep rate maxima coincide with the warmest permafrost temperatures ever measured in boreholes and are likely a result of the continuously warm conditions at the ground surface over the past seven years.

FÖNN	Name	Coordinates		Country	Elevation	Area	Aspect	Annual movement
		Latitude	Longitude		(m asl.)	(km²)	(class)	monitoring start
French rock glaciers (n=1)								
FR01	Laurichard	45°01'N	06°24'E	FR	2424-2644	0.08	N	1999
Swiss rock glaciers (n=26)								
CH01	Aget-Rogneux	46°01'N	07°14'E	CH	2810-2890	0.03	SE	2001
CH02	Mont-Gelé B / Yettes Conjà B	46°06'N	07°17'E	CH	2600-2740	0.02	NE	2000
CH03	Mont-Gelé C / Yettes Conjà C	46°06'N	07°17'E	CH	2620-2820	0.05	N	2000
CH04	Tsarmine	46°03'N	07°30'E	CH	2480-2650	0.04	W	2004
CH05	Becs-de-Bosson	46°10'N	07°31'E	CH	2610-2850	0.10	NW	2004
CH07	HuHH1 (Hungerlitälli 1)	46°11'N	07°43'E	CH	2630-2780	0.04	NNW	2001
CH08	HuHH3 (Hungerlitälli 3)	46°11'N	07°43'E	CH	2515-2650	0.05	NW	2002
CH10	Petit-Vélan	45°54'N	07°14'E	CH	2520-2810	0.06	NE	2005
CH11	Lac des Vaux B	46°06'N	07°17'E	CH	2720-2800	0.005	NW	2005
CH12	Lués Rares	46°06'N	07°18'E	CH	2320-2450	0.03	NE	2006
CH13	Les Closses	46°09'N	07°30'E	CH	2450-2550	0.03	W	2006
CH14	Tsaté-Moiry 1	46°07'N	07°33'E	CH	2680-2850	0.03	NE	2005
CH15	Tsaté-Moiry 2	46°07'N	07°33'E	CH	2720-2850	0.03	NE	2005
CH17	Grosse Grabe	46°10'N	07°49'E	CH	2600-2740	0.02	WNW	2007
CH18	Gugla-Bielzug	46°08'N	07°49'E	CH	2600-2820	0.03	W	2007
CH21	Grosses Gufer	46°25'N	08°05'E	CH	2380-2600	0.1	NW	2007
CH23	Gruben	46°10'N	07°57'E	CH	2770-2890	0.2	WSW	2012
CH24	Monte Prosa A	46°34'N	08°34'E	CH	2440-2570	0.03	N	2009
CH25	Monte Prosa B	46°33'N	08°34'E	CH	2450-2530	0.02	NW	2009
CH26	Stabbio di Lagrario	46°28'N	08°59'E	CH	2240-2550	0.17	N	2009
CH27	Piancabella / Valle di Sceru	46°27'N	09°00'E	CH	2450-2550	0.06	NE	2009
CH29	Ganoni di Schenadüi	46°33'N	08°45'E	CH	2480-2640	0.07	N	2009
CH30	Muragl	46 30'N	09°56'E	CH	2490-2750	0.12	NW	2009
CH31	Murtèl	46 26'N	09°49'E	CH	2630-2800	0.48	WNW	2009
CH32	Marmugnun	46 26'N	09°49'E	CH	2650-2700	0.10	NW	2009
CH33	Chastelets	46 26'N	09° 49'E	CH	2650-2700	0.10	NW	2009
Austrian rock glaciers (n=6)								
A03	Weissenkar	46°57'N,	12°45'E	AT	2610-2720	0.15	W	1997
A04	Hinteres Langtalkar	46°59'N,	12°46'E	AT	2455-2700	0.15	NW	1999
A05	Dösen	46°59'N,	13°17'E	AT	2340-2650	0.19	W	1995
A06	Äußere Hochebenkar	46°50'N	11°00'E	AT	2420-2870	0.40	NW	1952 (with gaps)
A08	Tschadinhorn	46°58'N	12°42'E	AT	2580-2790	0.10	WNW	2014
A09	Leibnitzkopf	46°56'N	12°42'E	AT	2440-2590	0.09	WNW	2010
Italian rock glaciers (n=2)								
I01	Lazaun	46°44'43"N	10°45'13"E	IT	2490-2810	0.17	NNE	2006
I02	Gran Sommetta	45°55'N,	7°40'E	IT	2640-2770	0.08	NNW	2012

Some examples of mulit-annual horizontal velocity data from Austria, France, Switzerland and Italy



List of rock glaciers in the European Alps with annual horizontal velocity data