

VARIABILIDAD CLIMÁTICA: CAMBIOS, PROCESOS E IMPACTO DEL AMBIENTE PERIGLACIAL EN CUENCAS ANDINAS

Dr. Cristian Daniel Villarroel



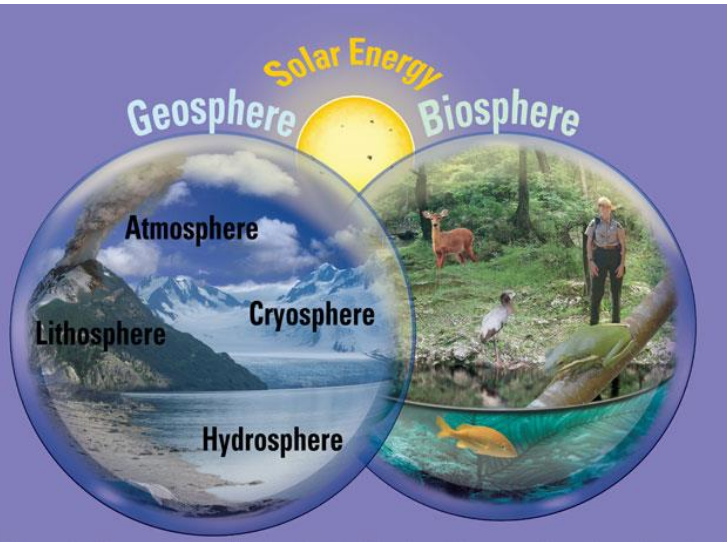
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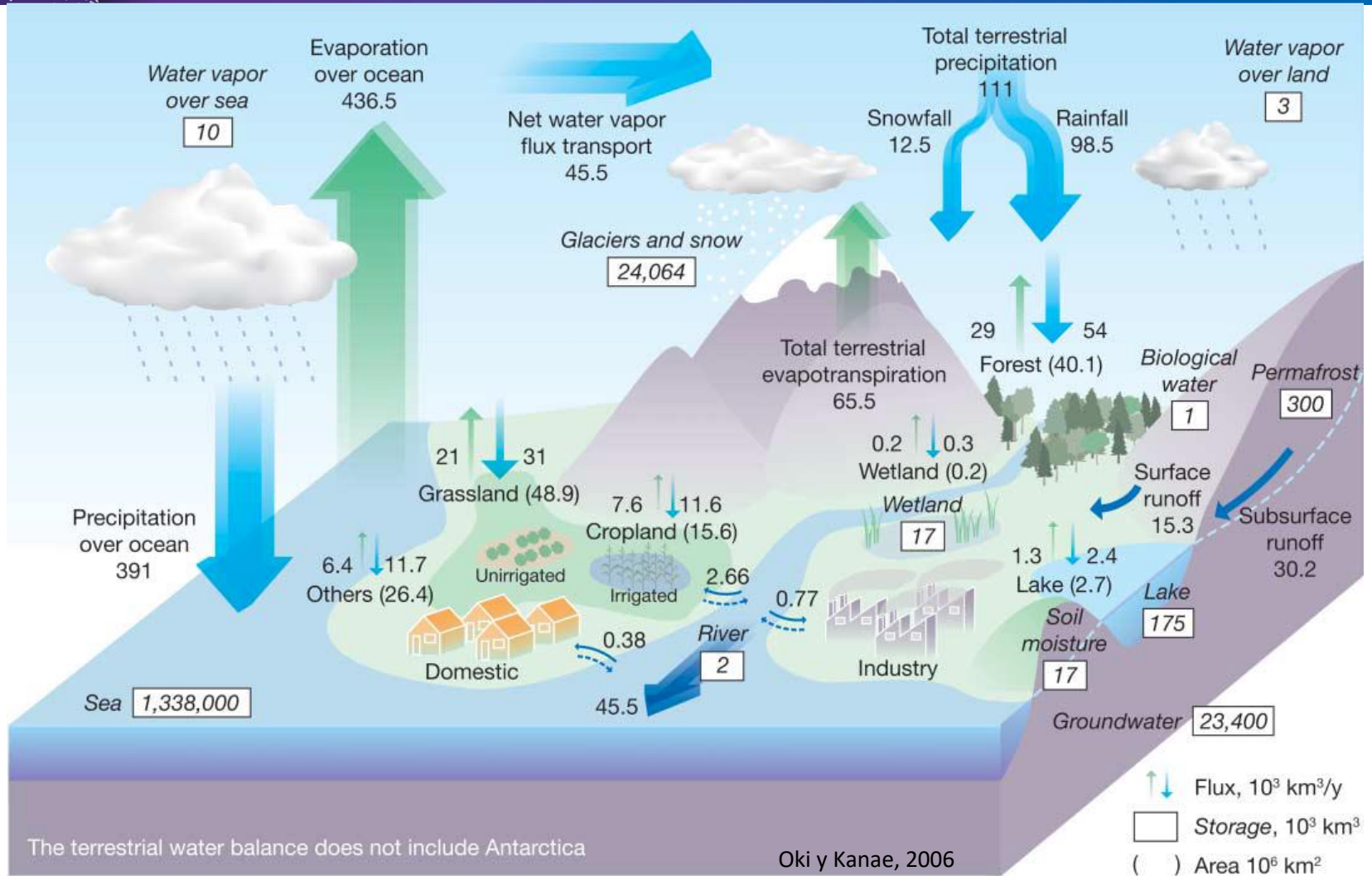
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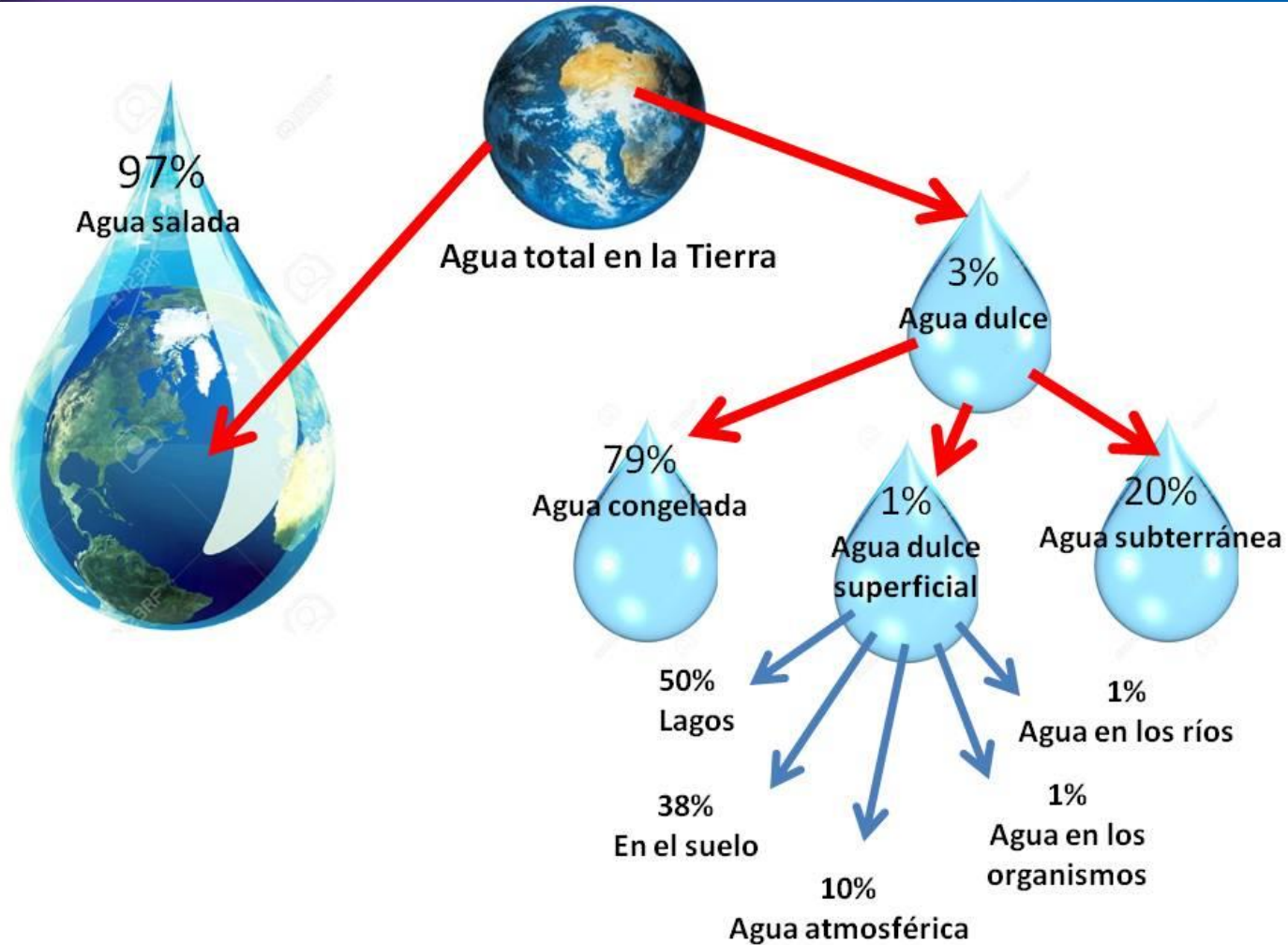
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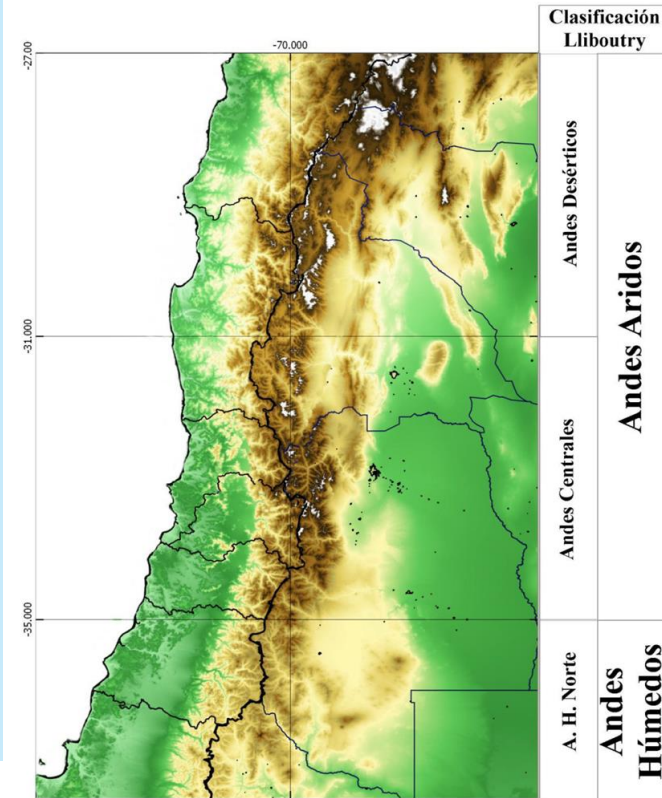
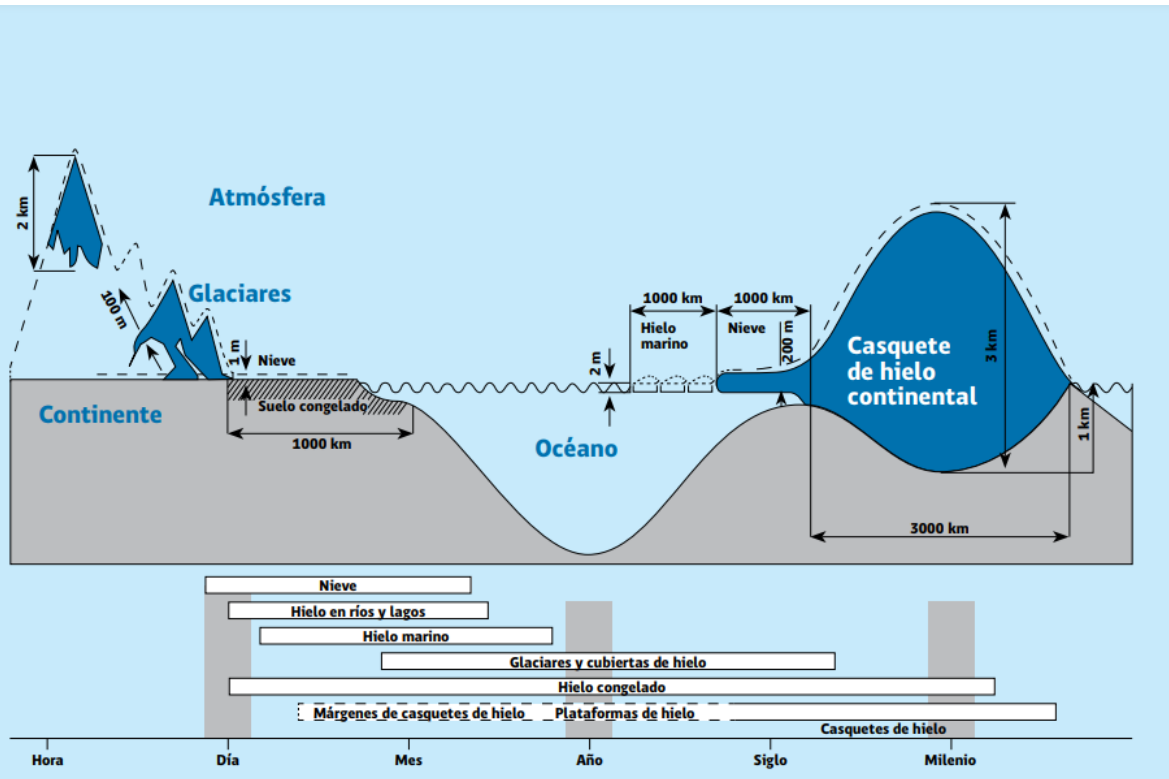
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Rivera et al. (2007)



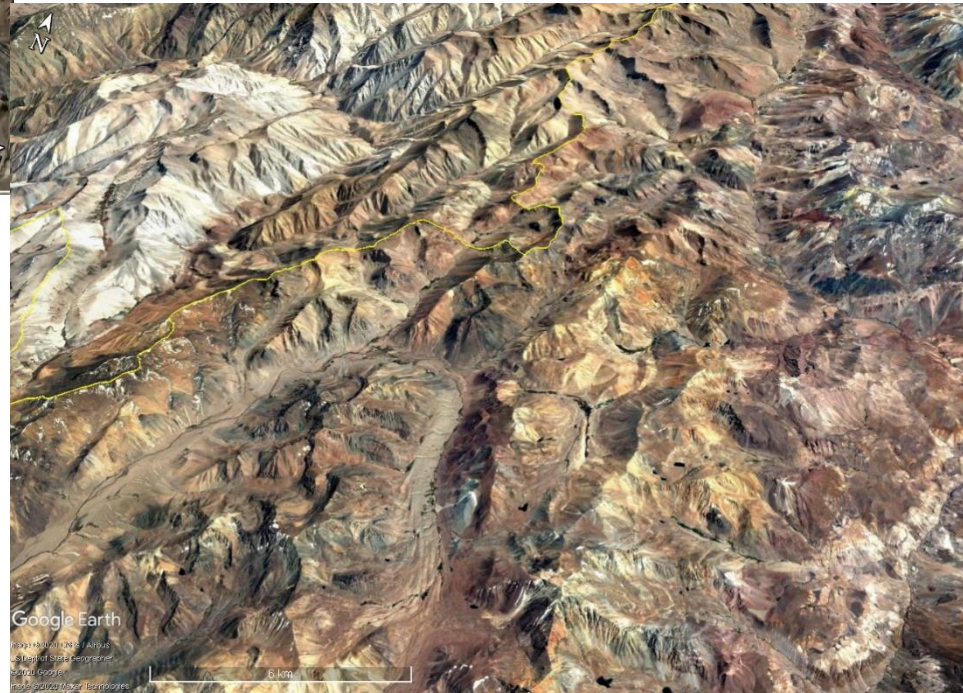
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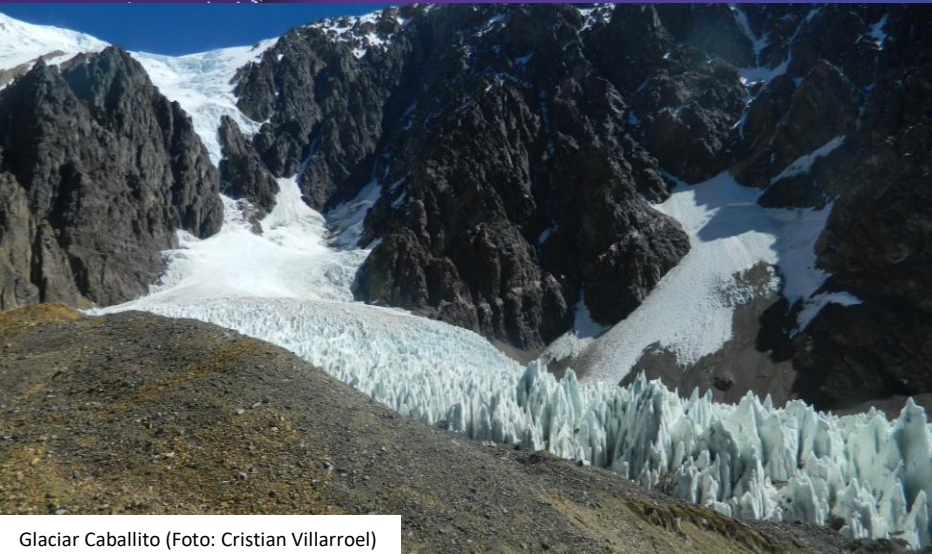
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Glaciar Caballito (Foto: Cristian Villarroel)



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Glaciar Caballito (Foto: Ana Paula Forte)

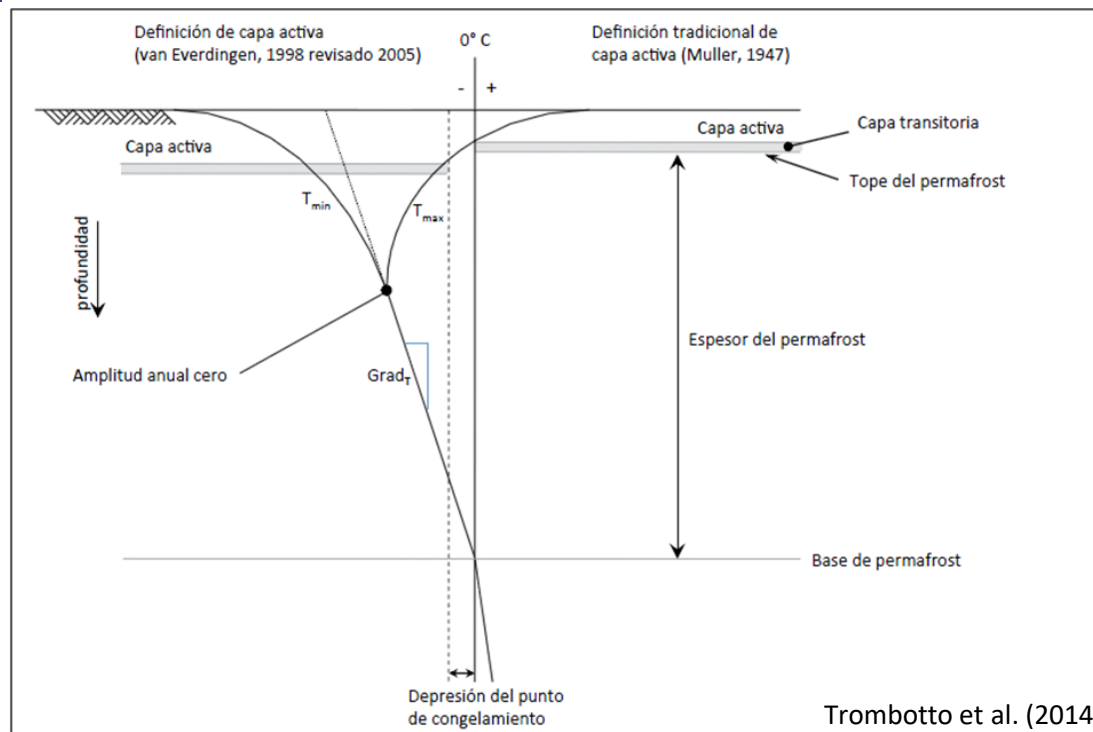


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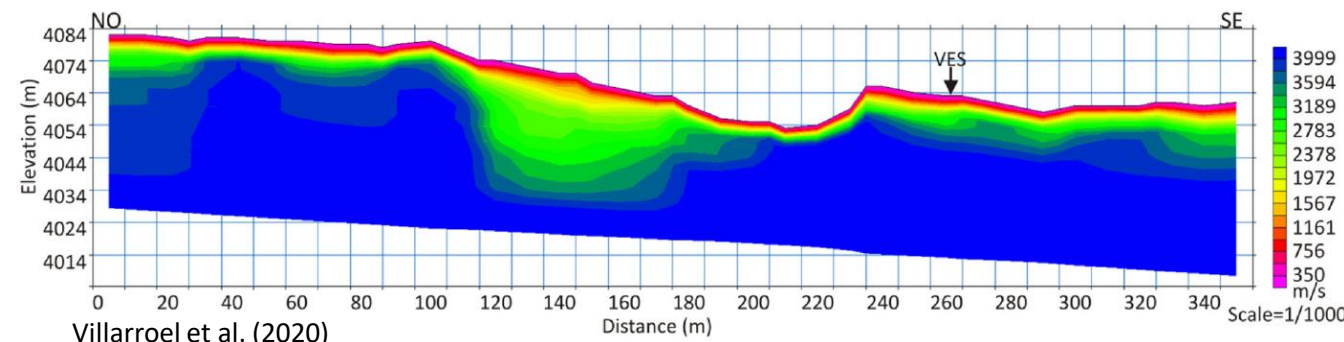
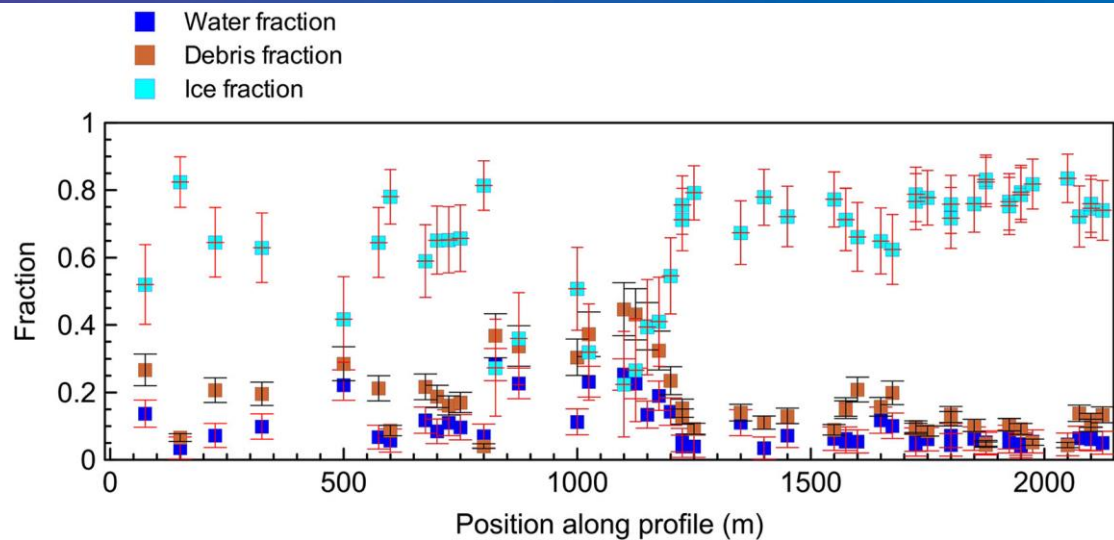
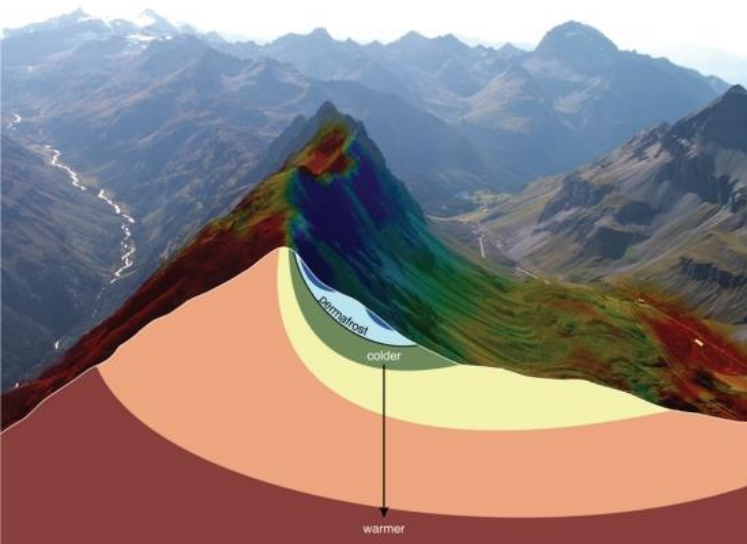
Ambiente Periglacial: Walery von Lozinski (1909) - Tricart (1968)

Ambiente Frío o Criótico No Glaciario

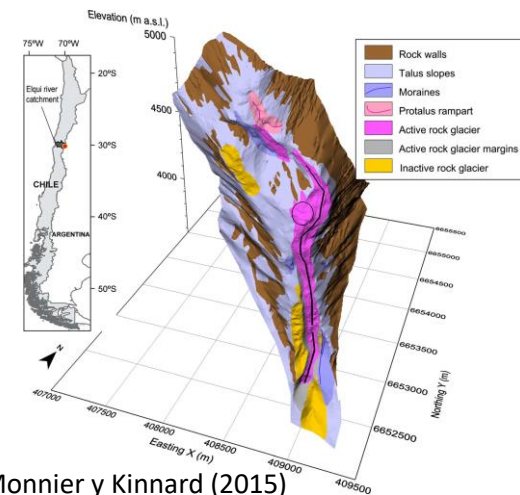
- Procesos: congelamiento-descongelamiento, solifluxión, gelifluxión, crioclastismo, crioturación, etc.
- Permafrost
- Geoformas: Glaciares de roca o escombros, protalus ramparts, suelos estructurados, pendientes detríticas, lóbulos de solifluxión/gelifluxión, etc.



Tapia (2018)



Villarroel et al. (2020)



Monnier y Kinnard (2015)



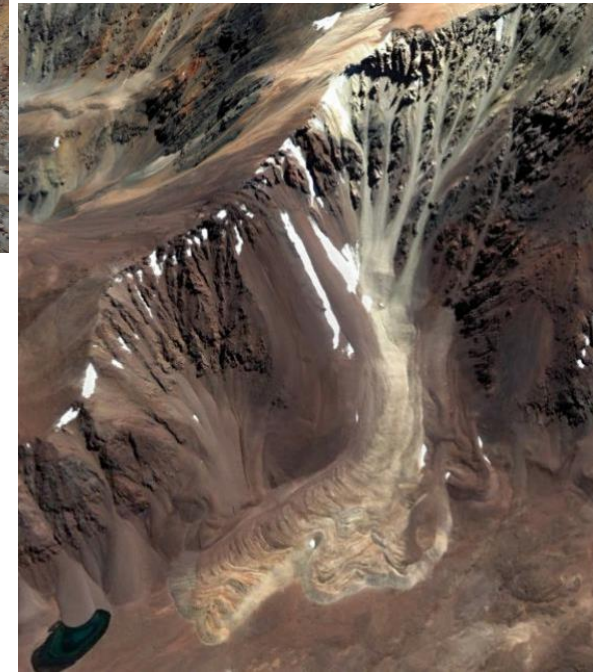
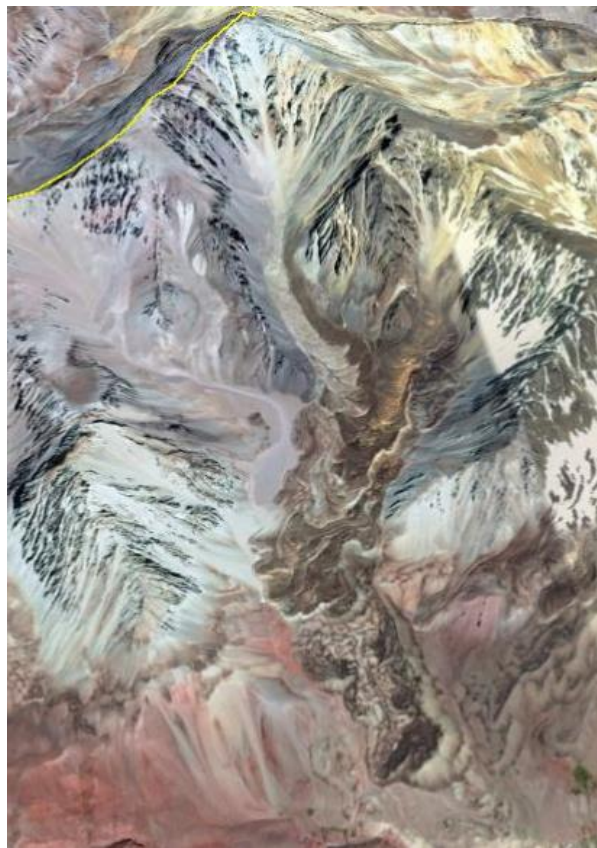
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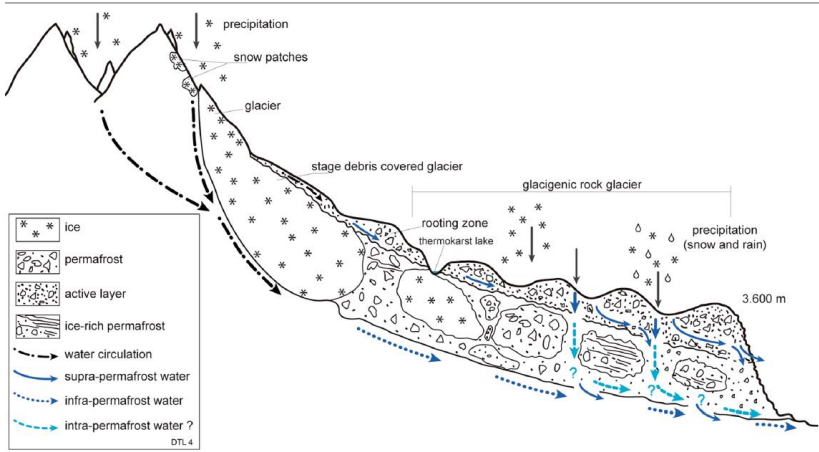
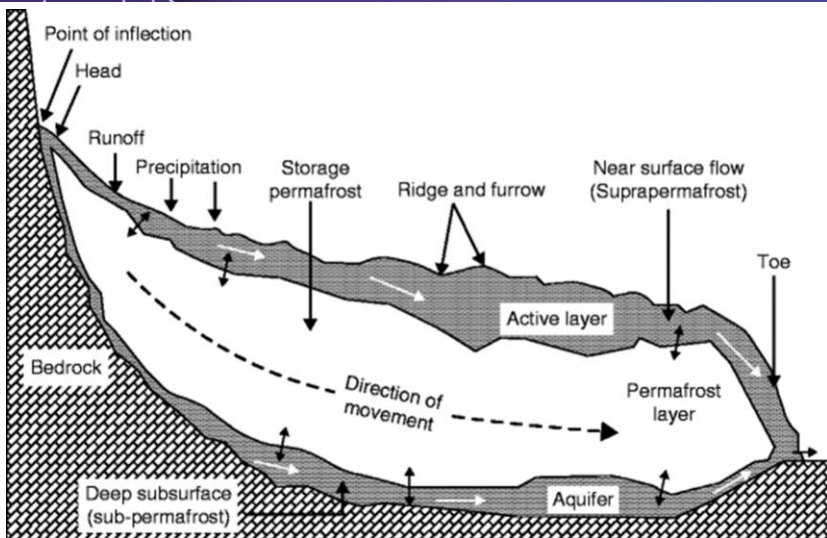
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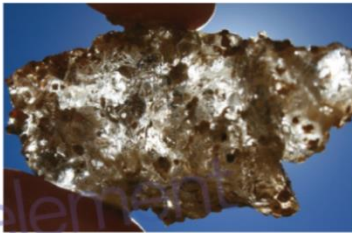
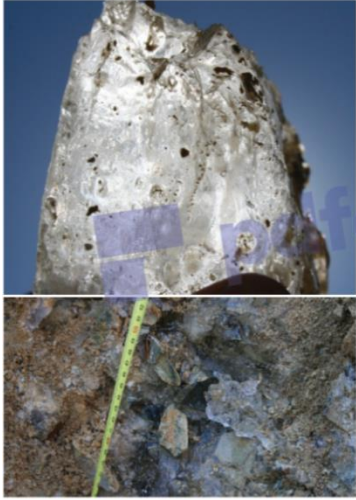
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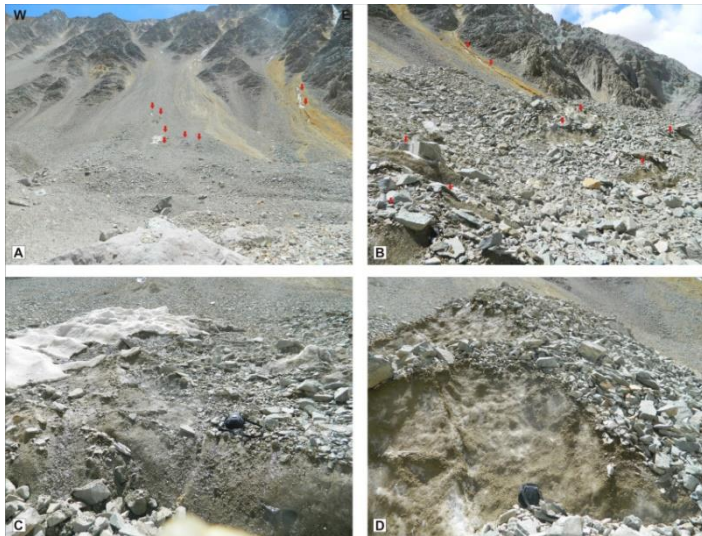


Trombotto et al. (2020)





Arenson et al. (2010)



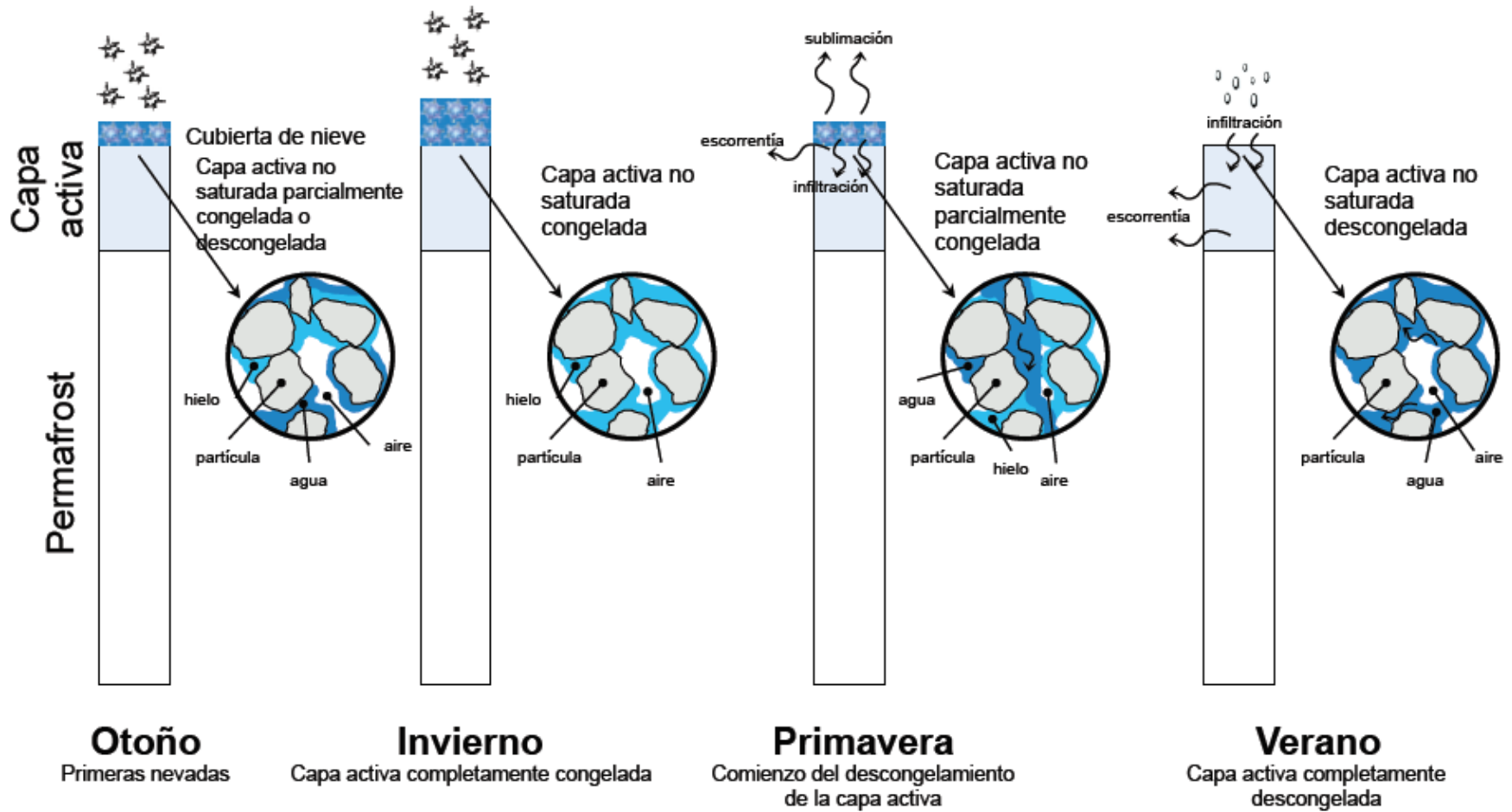
Villarroel et al. (En preparación)

Latitudinal class	Rock glacier density [%]	Rock glacier area [km ²]	Rock glacier water equivalent [km ³]	Glacier area [km ²]	Glacier water equivalent [km ³]	Ratio of rock glacier to glacier water equivalent
27–28°S	0.1	2.0	0.03	3.6	0.09	1:2.9
28–29°S	1.8	20.1	0.32	29.1	0.85	1:2.7
29–30°S	1.1	24.0	0.39	14.5	0.32	1.2:1
30–31°S	1.4	30.0	0.48	1.9	0.06	8.3:1
31–32°S	2.0	16.3	0.26	0	0	∞
32–33°S	2.5	55.2	0.89	n.a.	n.a.	n.a.
Total	1.4	147.5	2.37	49.0	1.32	

n.a.: Data not available.

River basin	Basin area [km ²]	Estimated rock glacier area [km ²]	Estimated rock glacier water equivalent [km ³]	Glacier area	Glacier water equivalent	Ratio of rock glacier to glacier water equivalent
Endorrheic altiplano ^a	3091	1.2	0.02	2.5	0.07	1:3.5
Río Copiapó	18704	11.4	0.18	21.1	0.67	1:3.7
Río Huasco	9813	23.5	0.38	21.3	0.48	1:1.3
Río Elqui	9826	32.2	0.52	4.1	0.10	5.2:1
Río Limarí	11696	16.8	0.27	0	0	∞
Río Choapa	7654	18.4	0.30	0	0	∞
Río Aconcagua	7334	43.5 ^b	0.70 ^b	~80 ^c	n.a. ^c	n.a. ^c

Azócar y Brenning (2010)

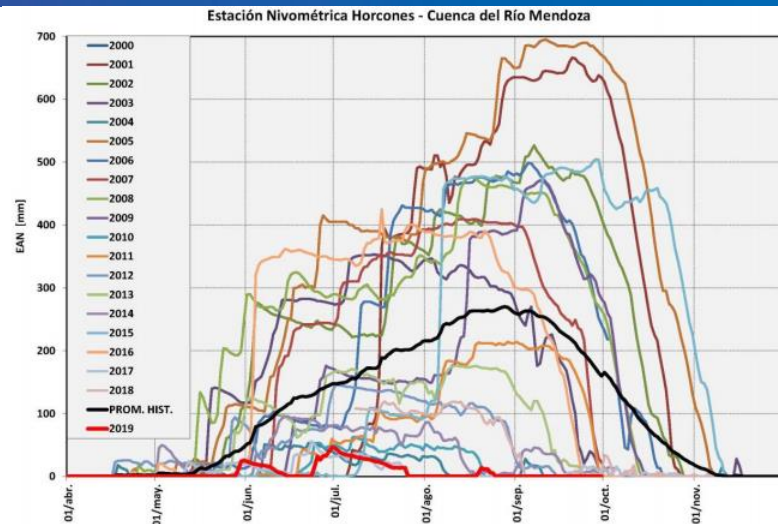


Trombotto et al. (2014)

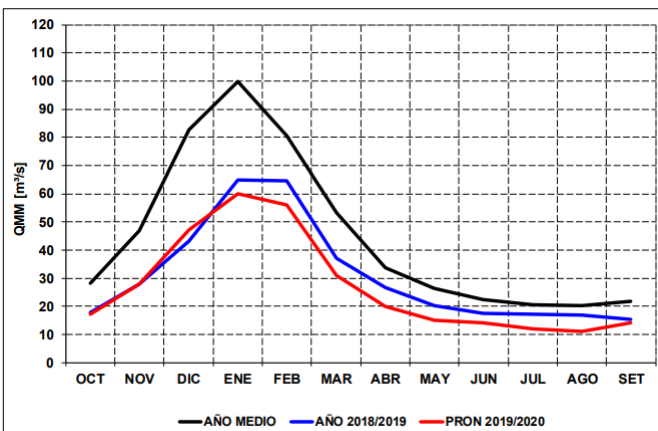


DERRAME ANUAL X RÍO	AÑO HIDROLÓGICO	PRONOSTICADO	MEDIA HISTÓRICA	% RESPECTO A AÑO MEDIO
MENDOZA	SECO	850 hm ³	1407,3 hm ³	60%
TUNUYÁN	SECO	460 hm ³	869,2 hm ³	53%
DIAMANTE	SECO	490 hm ³	1038,2 hm ³	47%
ATUEL	SECO	590 hm ³	1114,2 hm ³	53%
MALARGÜE	SECO	140 hm ³	301,7 hm ³	46%
GRANDE	SECO	1350 hm ³	3302,6 hm ³	41%

Fuente: DGI

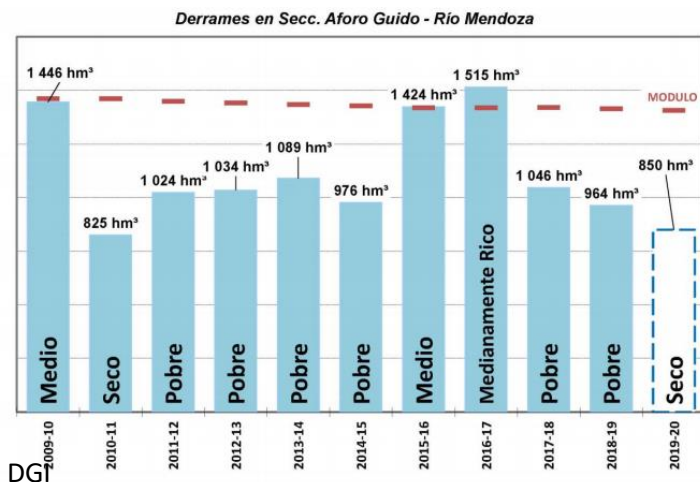


Fuente: DGI

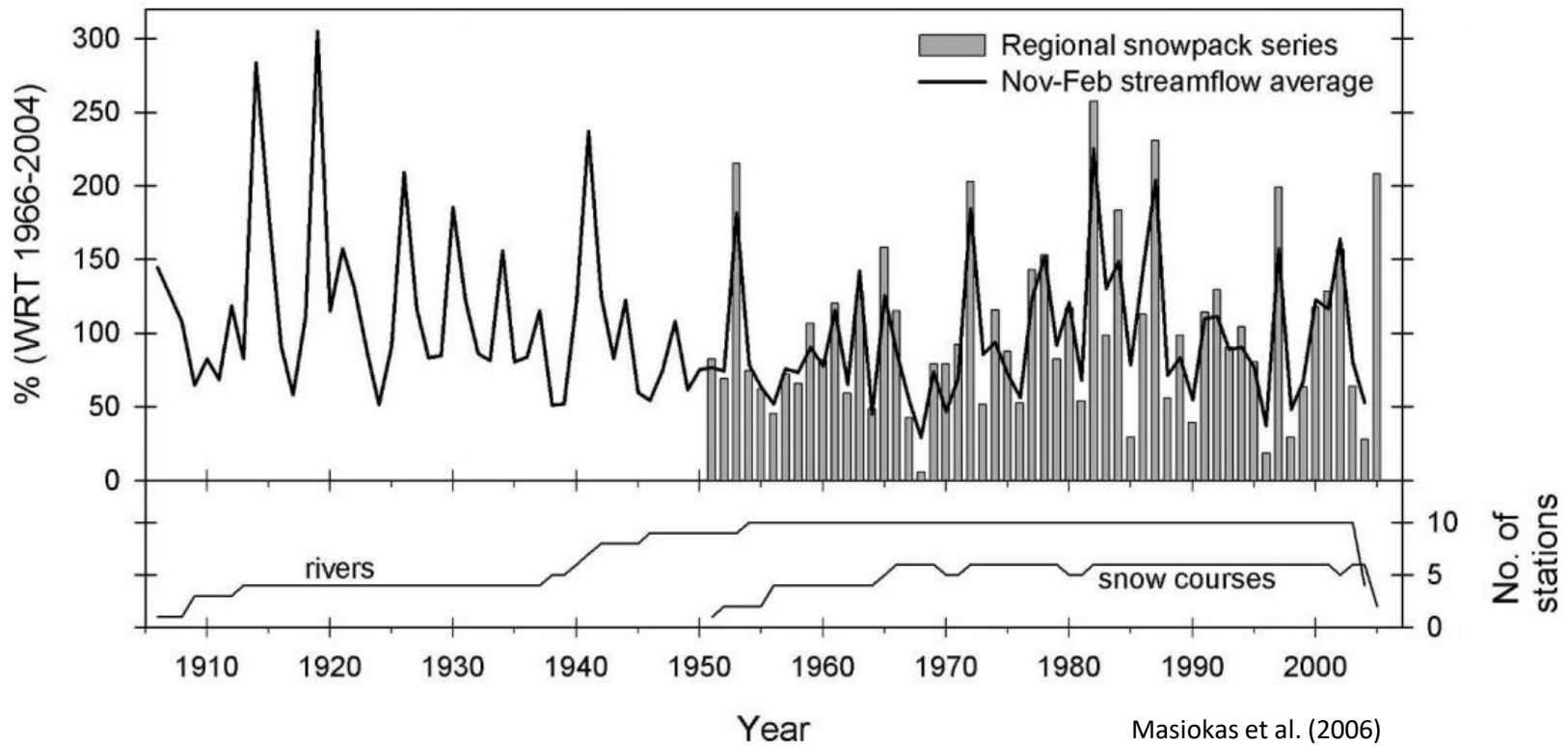


Fuente: DGI

Estación Guido (32°51'S y 69°16'O), Río Mendoza

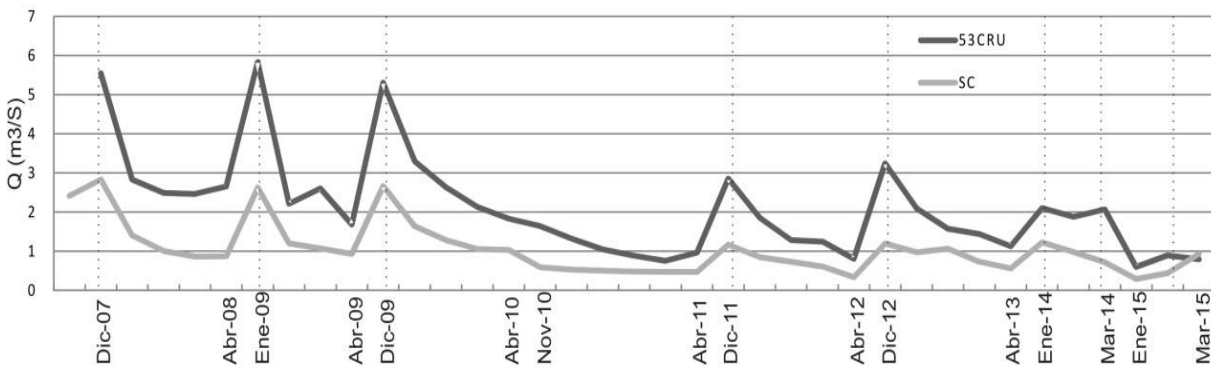


Fuente: DGI

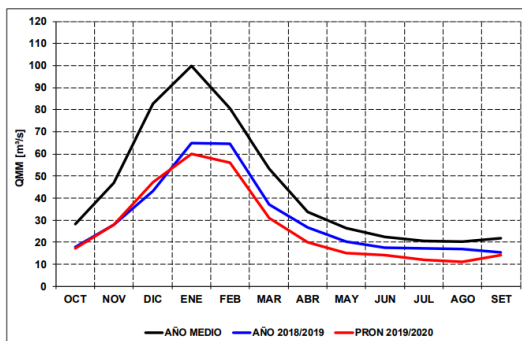
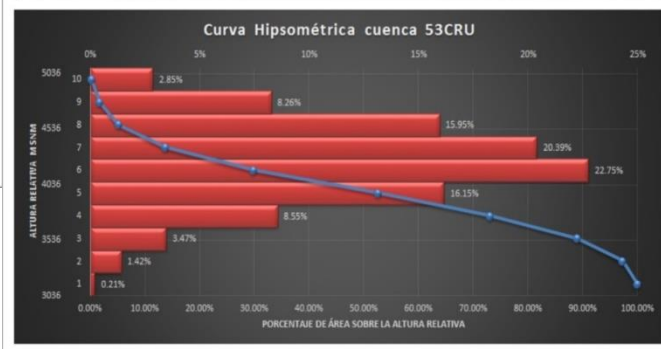
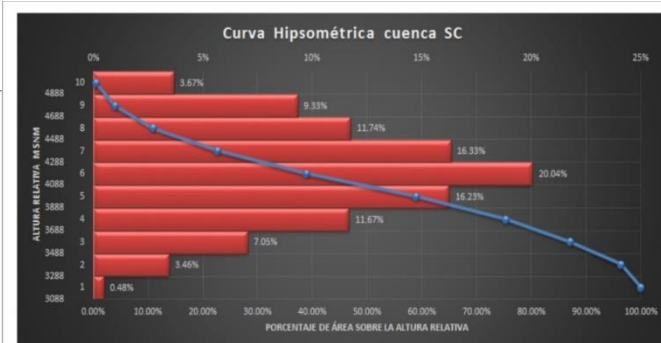




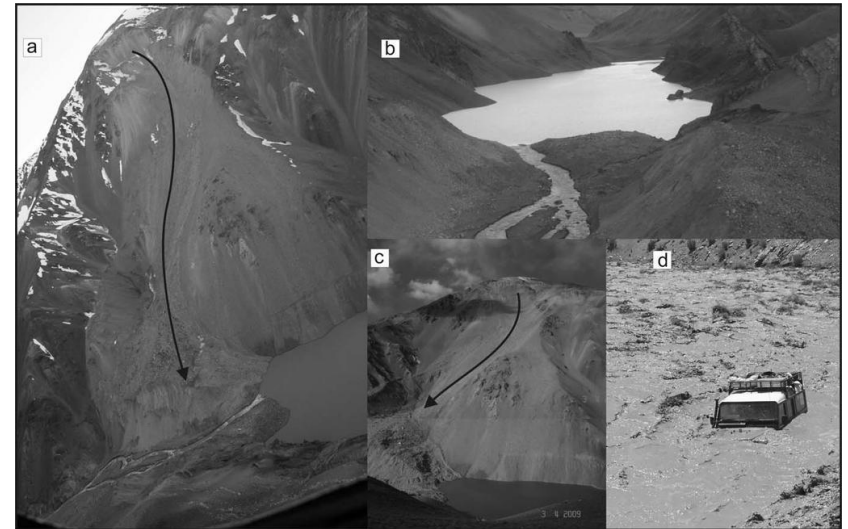
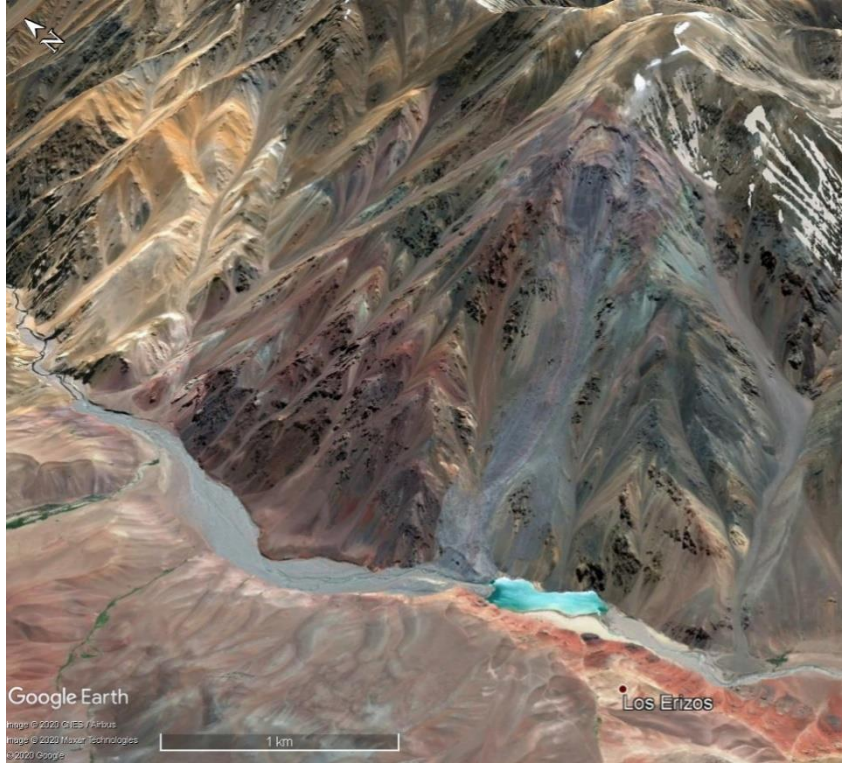
Caudal mensual río Santa Cruz



Villarroel (2019)



QMM = Caudal Medio Mensual



Perucca y Esper Angillieri (2009)



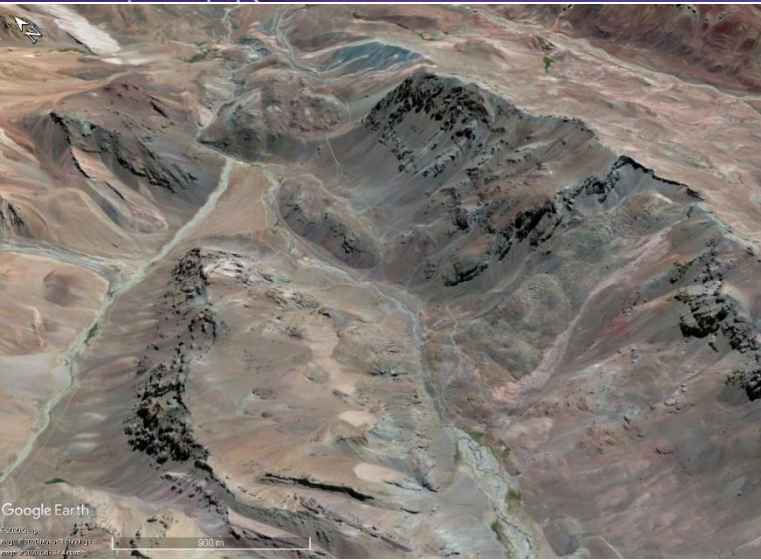
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MUCHAS GRACIAS POR SU ATENCIÓN

