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PROGRAMA LATINOAMERICANO

CIUDADES SOSTENIBLES E INTELIGENTES AL 2030

"Hacia un modelo de innovación inclusiva"

Con el respaldo académico de:



Con el apoyo de:



Cambio climático y repercusiones para Latinoamérica

Eduardo Calvo, IPCC, UNMSM

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- Ecosistemas de montaña

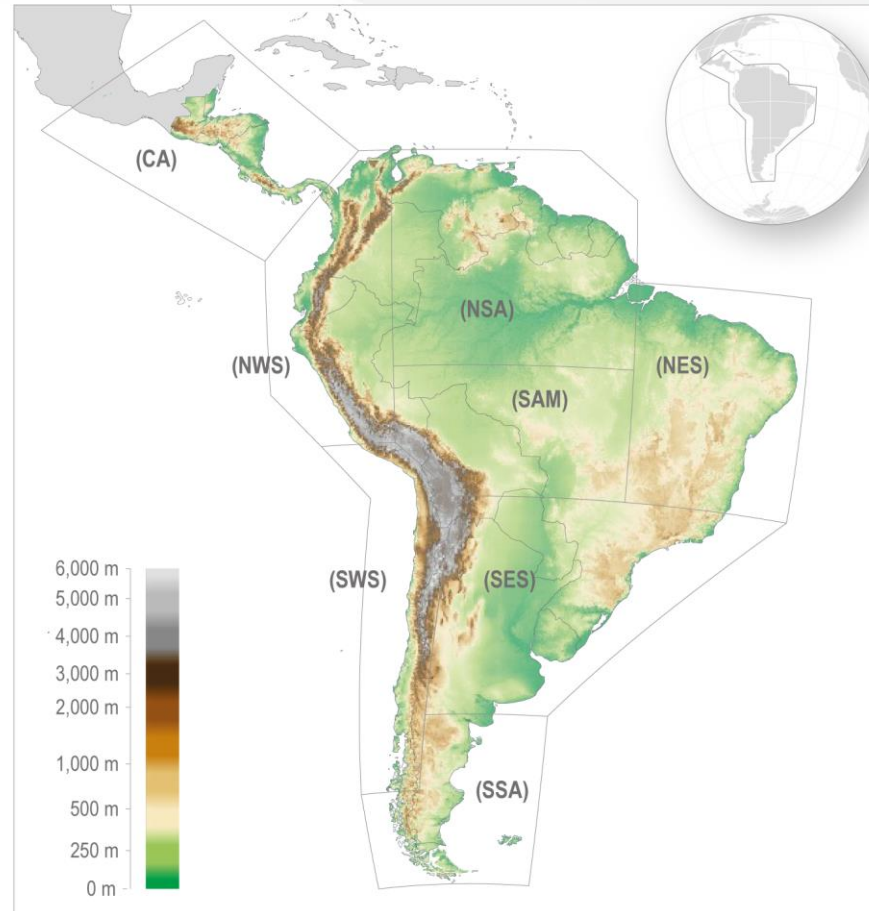
Alcance geográfico

Geographical scope of Central and South America

Polygon delineations represent the boundaries used for the regional synthesis of historical trends and future climate change projections used in the Assessment Reports of the IPCC WGI.

- (a) Central America (CA)*
- (b) Northwestern South America (NWS)
- (c) Northern South America (NSA)
- (d) South America Monsoon (SAM)
- (e) Northeastern South America (NES)
- (f) Southwestern South America (SWS)
- (g) Southeastern South America (SES)
- (h) Southern South America (SSA)

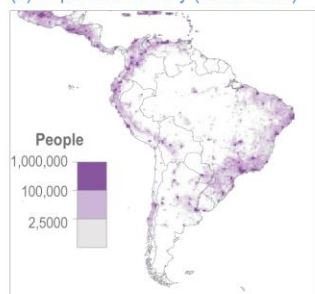
* Different from the WGI South Central America (SCA) which includes the southern part of Mexico.



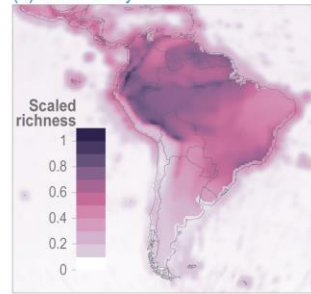
Caracterización de la región

Socioeconomic and biophysical characterization of the region

(a) Population density (1995–2014)



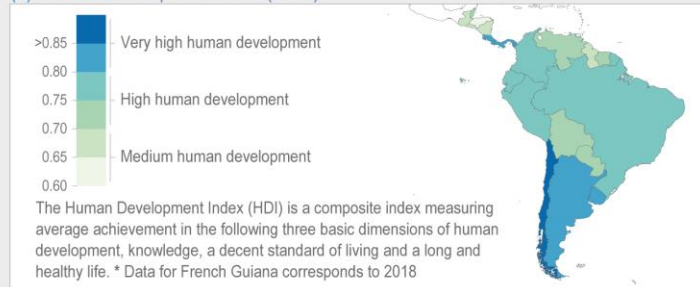
(b) Biodiversity



(c) Land cover (2019)



(d) Human Development Index (2019)*



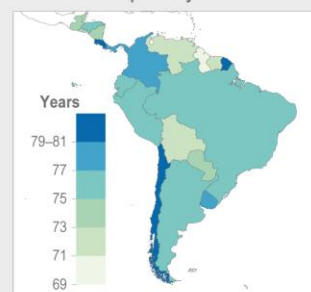
Mean years of schooling



Gross national income per capita



Life expectancy at birth

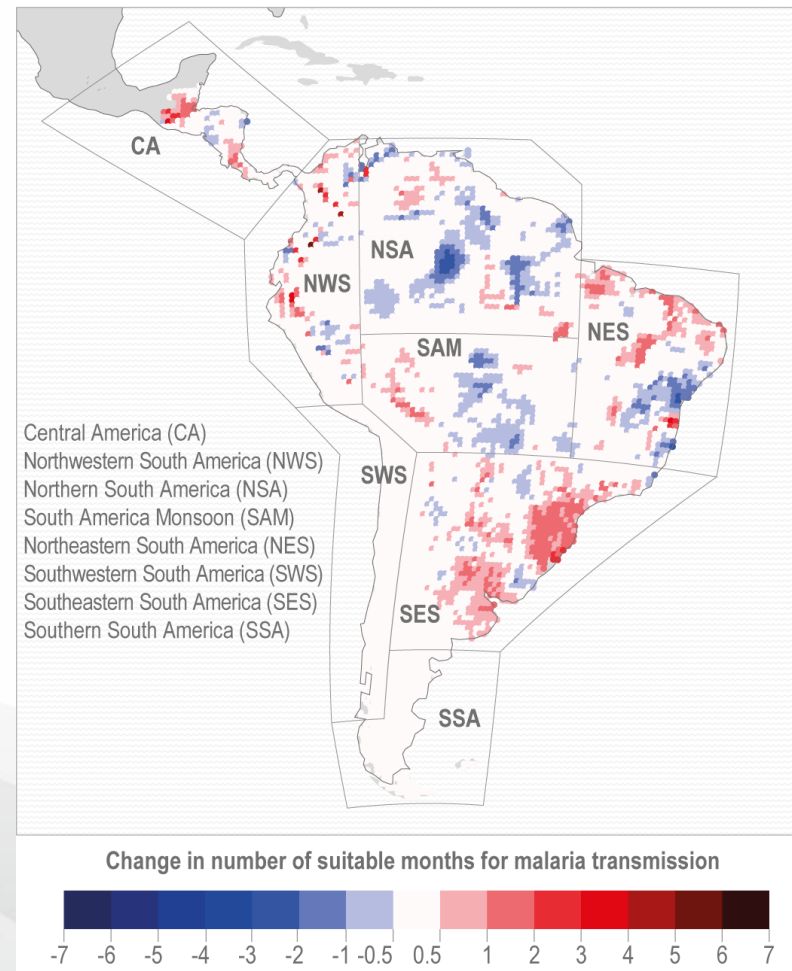


Expected years of schooling



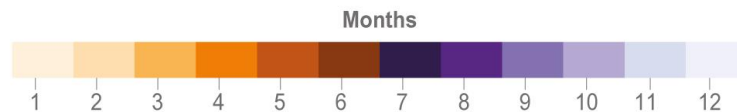
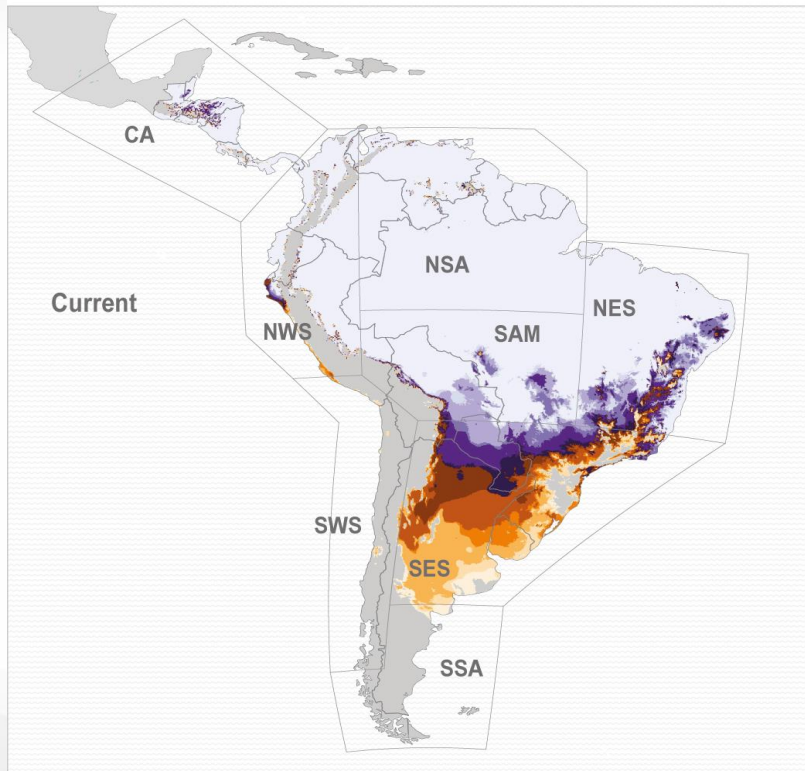
Cambio en meses de transmisibilidad de malaria

Historical changes (1950–59 to 2010–2019)
in suitability for malaria transmission

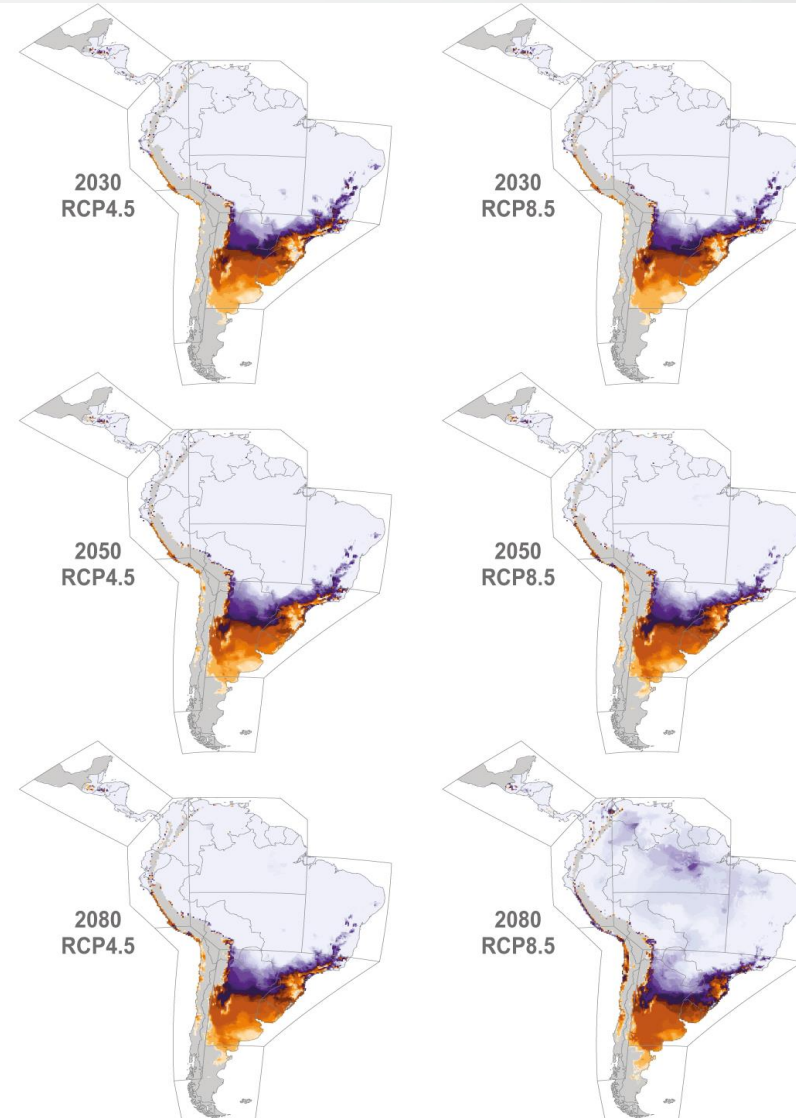


Transmisibilidad de dengue

Predicted thermal suitability for transmission of dengue by *Aedes aegypti* mosquitoes

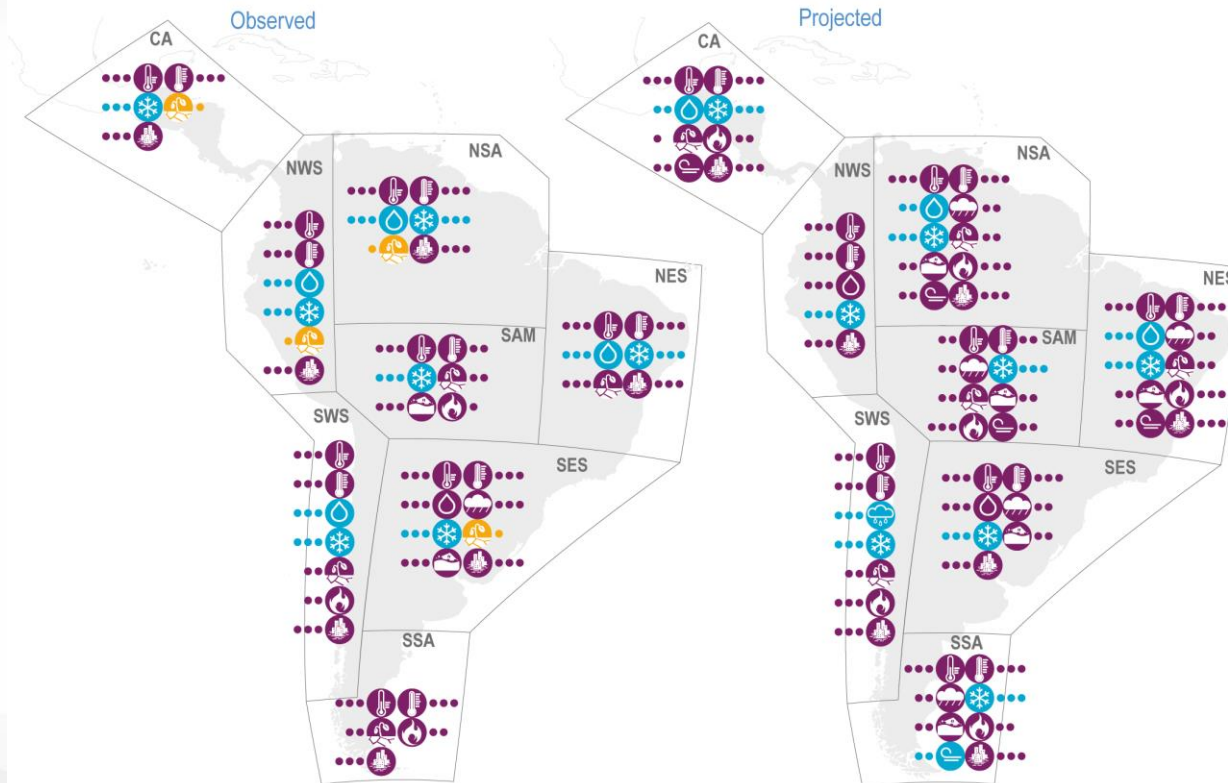


Central America (CA) • Northwestern South America (NWS) • Northern South America (NSA) • South America Monsoon (SAM) • Northeastern South America (NES) • Southwestern South America (SWS) • Southeastern South America (SES) • Southern South America (SSA)



Peligros observados y proyectados

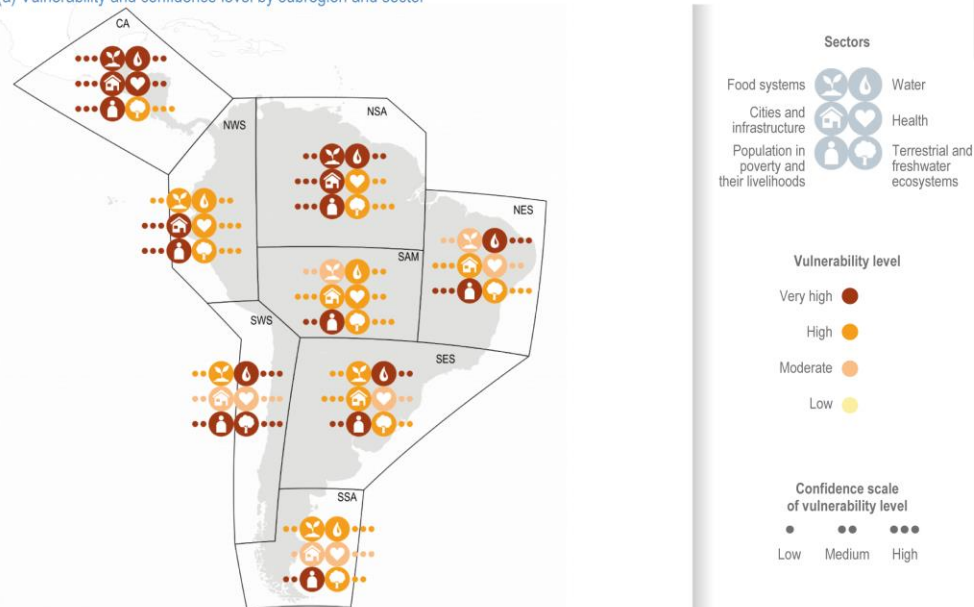
Observed and projected hazards in Central and South America



Vulnerabilidad sectorial

Sectoral distribution of vulnerability to climate change for Central and South America

(a) Vulnerability and confidence level by subregion and sector



(b) References used and vulnerability level attributed by subregion and sector

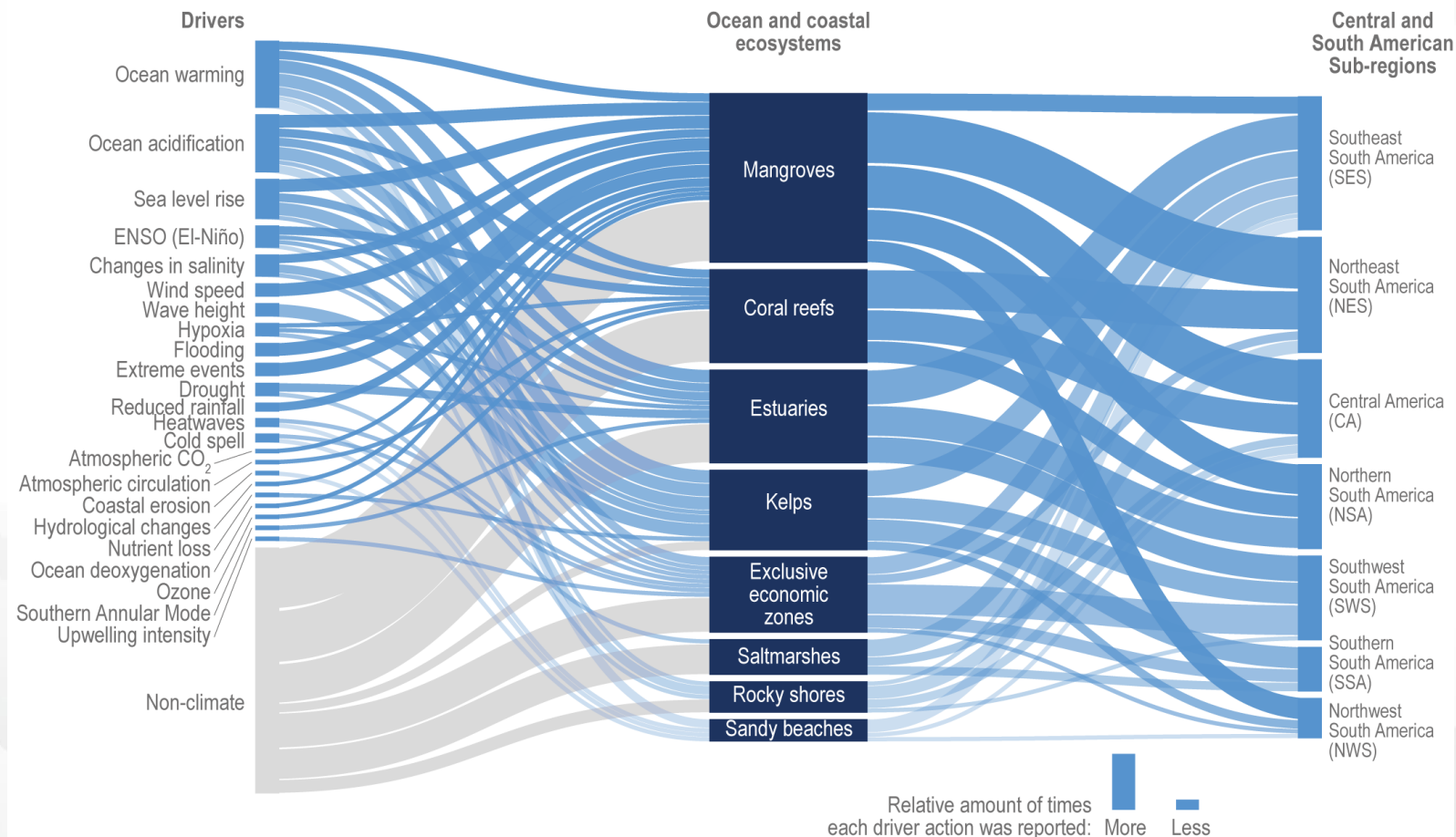
Sectors	Subregions						
	CA	NES	NSA	NWS	SAM	SES	SSA
Food systems	4,6,9,11,14,19,21,27,35,40,47	6,9,16,21,22,27,35,47	6,9,11,14,19,21,27,35,45,47	6,14,19,21,22,27,35,40,45	6,21,27,35,47	6,9,14,21,22,27,35,47	6,14,21,22,27,35,39,47
Cities and infrastructure	5,35	5,31,25	5,35	5,35	5,35	5,35	5,35
Population in poverty and their livelihoods	7,15,10,12,13,23,25,40	10,12,13,15,17,2,5,28,49	10,12,13,15,17,25,28,33	10,12,13,15,25,40	10,12,13,15,17,25	10,12,13,15,17,25,28	10,12,13,15,25,40,44
Water	26,35,41	26,35,48,49,50	24,26,35	24,26,35	24,26,35	24,26,35,41	24,26,35,39
Health	20,30,35	20,30,35,50	20,30,35	20,30,35	20,30,35	20,30,35	20,30,35
Terrestrial and freshwater ecosystems	29,35,38	2,29,32,35,37,38,42	2,29,35,37,38	2,8,24,29,35,37,38	2,29,35,37,38	29,35,38	24,29,35,38

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Sensibilidad de océanos y ecosistemas costeros

Sensitivity of ocean, coastal ecosystems, and Exclusive Economic Zones (EEZs) to climate and non-climate drivers in Central and South America

Synthesis of field and laboratory experiments reporting drivers generating sensitivity on ocean, coastal ecosystems and EEZs



Impactos observados y proyectados

Observed and projected impacts for the subregions of Central and South America

		CA		NWS		NSA		SAM		NES		SES		SWS		SSA	
		Obs.	Proj.	Obs.	Proj.	Obs.	Proj.	Obs.	Proj.	Obs.	Proj.	Obs.	Proj.	Obs.	Proj.	Obs.	Proj.
Terrestrial and freshwater ecosystems and their services	Temperate forests	/	/	/	/	/	/	na	na	na	/	na	na	na	na	na	na
	Tropical forests	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Lakes, rivers and wetlands	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Grassland and savanna	/	/	/	/	/	/	na	na	na	na	na	na	na	na	na	na
	Deserts	/	/	na	na	/	/	na	na	na	/	na	na	na	na	/	/
	Mountains	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Ocean and coastal ecosystems	Estuaries	na	na	na	na	na	na	/	/	na	na	na	na	na	na	na	na
	Mangroves	na	na	na	na	na	na	/	/	na	na	na	na	/	/	/	/
	Coral reefs	na	na	na	na	na	na	/	/	na	na	na	na	/	/	/	/
	Sandy beaches	na	na	na	na	na	na	/	/	na	na	na	na	na	na	na	na
	Kelps	/	/	na	na	/	/	/	/	na	na	na	na	na	na	na	na
	Rocky shores	na	na	na	na	na	na	/	/	na	na	na	na	na	na	na	na
	Saltmarshes	na	na	/	/	na	na	/	/	na	na	na	na	na	na	na	na
	Exclusive Economic Zones (EEZs)	na	na	na	na	na	na	/	/	na	na	na	na	na	na	na	na
Water	Cryosphere reservoir	/	/	na	na	/	/	/	/	na	na	na	na	na	na	na	na
	Aquifers and groundwater	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Stream flow	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Water quality	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Food, fibre and other ecosystem products	Annual crop systems	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Livestock and pasture	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Permanent crops (fruit production)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Forestry and wood production	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Fisheries and aquaculture systems	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Cities and infrastructure	Urban land and built environment	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Land Use	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Housing stock	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Water supply, rainwater drainage and sewer infrastructure	Water supply, rainwater drainage and sewer infrastructure	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Energy	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Mobility and transport systems	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Health	Labor productivity	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Morbidity	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Mortality	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Poverty, livelihoods and sustainable development	Territory	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Livestock mortality	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Income	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Human dimension	Migration and displacement	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Conflicts	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Indigenous knowledge and local knowledge	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

Impact level Low Medium High na = not assessed / = not applicable

Confidence level:

Observed impacts

Low

Medium

High

Confidence level:

Projected impacts

Low

Medium

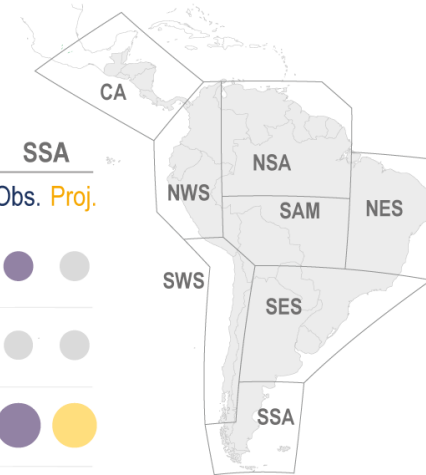
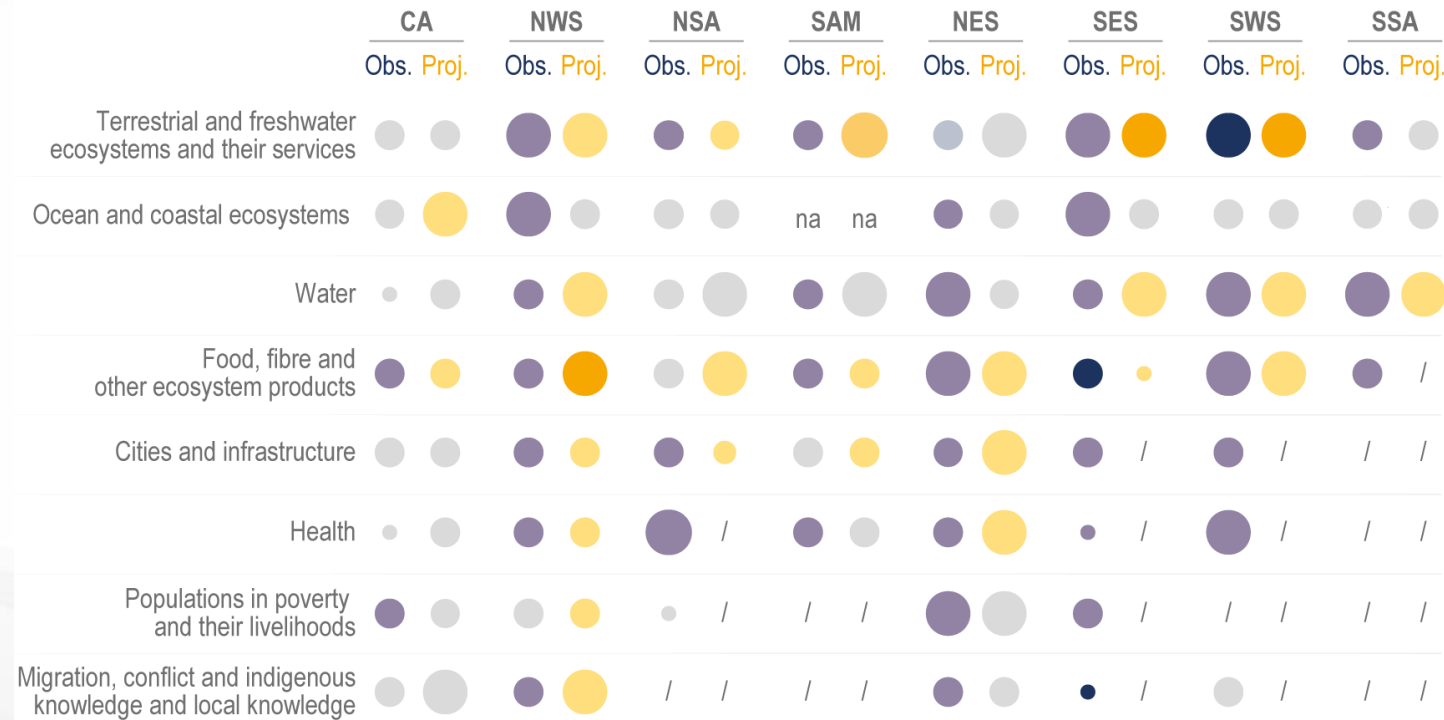
High

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Síntesis de impactos observados y proyectados

Synthesis of observed and projected impacts to main sectors in Central and South America

Projections averaged across scenarios and 21st century



- Central America (CA)
- Northwestern South America (NWS)
- Northern South America (NSA)
- South America Monsoon (SAM)
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Impact level Low Medium High

/ = not assessed na = not applicable

Confidence level: Observed impacts

Confidence level: Projected impacts

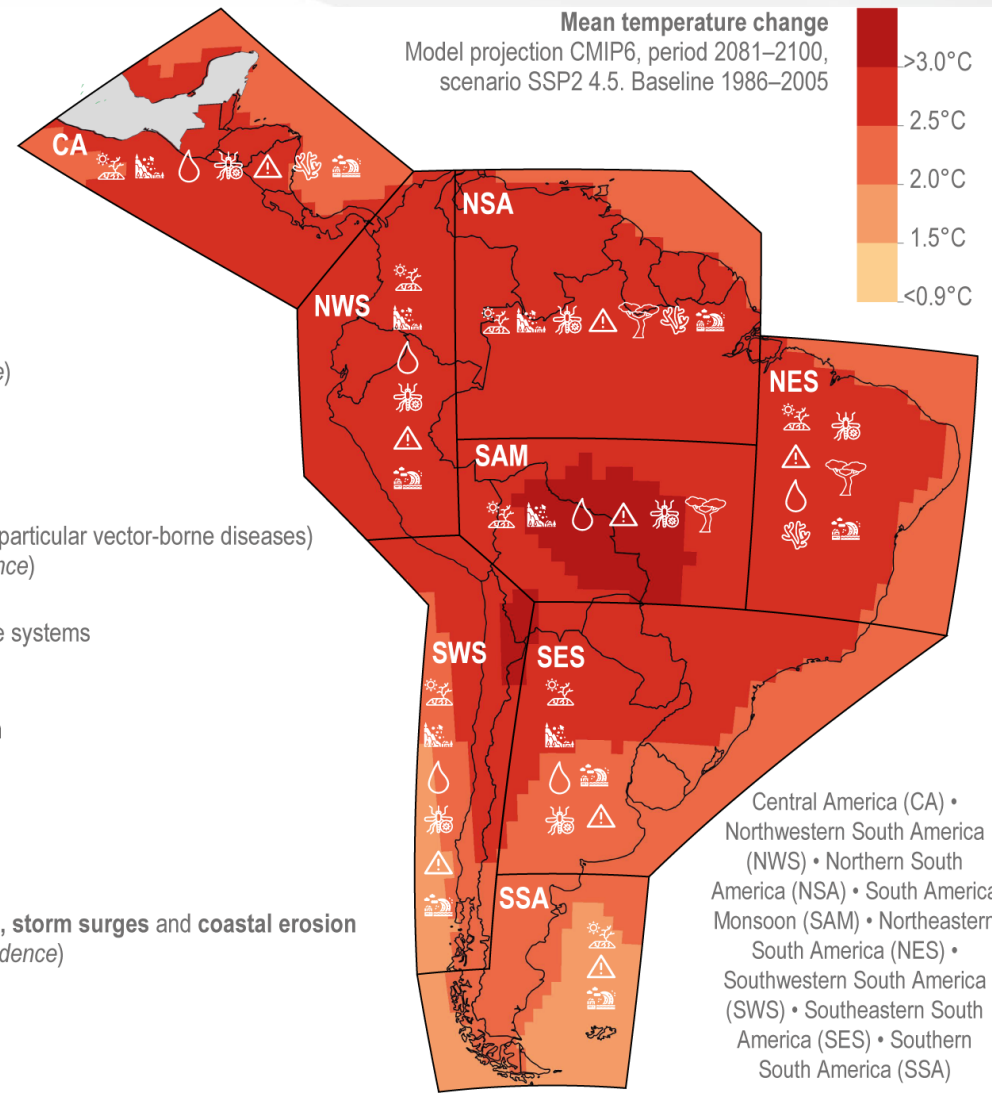
Low Medium High

Riesgos principales por subregión

key risks by subregion in Central and South America

Key risks

- (1) Risk of **food insecurity** due to frequent/extreme droughts
• Central and South America (*Medium confidence*)
- (2) Risk to life and infrastructure due to **floods** and **landslides**
• CA, NWS, NSA, SAM, SES, SWS (*Medium confidence*)
- (3) Risk of **water insecurity**
• CA, NWS, SAM, NES, SES, SWS (*High confidence*)
- (4) Risk of severe health effects due to increasing **epidemics** (in particular vector-borne diseases)
• CA, NWS, NSA, SAM, NES, SES, SWS (*High confidence*)
- (5) **Systemic risks** of surpassing infrastructure and public service systems
• Central and South America (*Medium confidence*)
- (6) Risk of large-scale changes and **biome shifts in the Amazon**
• NSA, SAM, NES (*Medium confidence*)
- (7) Risk to coral reef ecosystems due to **coral bleaching**
• CA, NSA, NES (*High confidence*)
- (8) Risk to coastal socio-ecological systems due to **sea level rise, storm surges** and **coastal erosion**
• CA, NWS, NSA, NES, SES, SWS, SSA (*Medium confidence*)

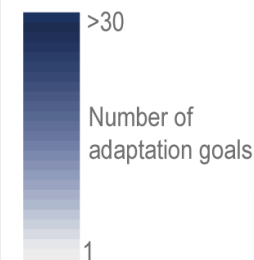


Metas de adaptación identificadas para sistemas costeros y oceánicos

Adaptation Goals identified for ocean and coastal systems

in National Adaptation Plans of Central and South American countries

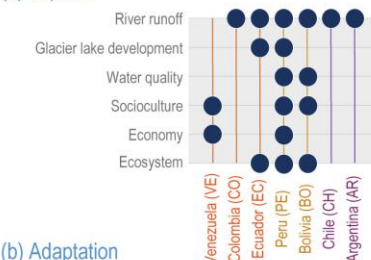
	Research and monitoring	Legislation and policies	Biodiversity and conservation	Risk management	Productive management	Infrastructure and tech	Capacity building and awareness	Financial management	Water and residues management	Social inclusion	Traditional practices
Chile	30	10	7	1	4	2	4	1	1		
Guatemala	9	8	16	3	4	3	3	1	4	1	2
Brazil	24	8	2	6	1		1	1	1		
Peru	4	3	3	8	7	2	5			2	1
Suriname	6	9	3		2	4	1	2	4		
Guyana	3	4	2	7	4	1	1	4	2	2	
Honduras	2	5	8	2	5	2					
Argentina	3	3	4	2	1	2					
Uruguay	3	1		5			1	4		1	1
Colombia		1	4	1		1		1	1		
Nicaragua		1			6						
Ecuador			2								
Costa Rica											
El Salvador											
Total	84	53	51	35	34	17	16	14	13	6	4



Ecosistemas de montaña

Overview map of observed glacier changes, associated impacts, adaptation and policy efforts across the Andes

(a) Impacts



(b) Adaptation

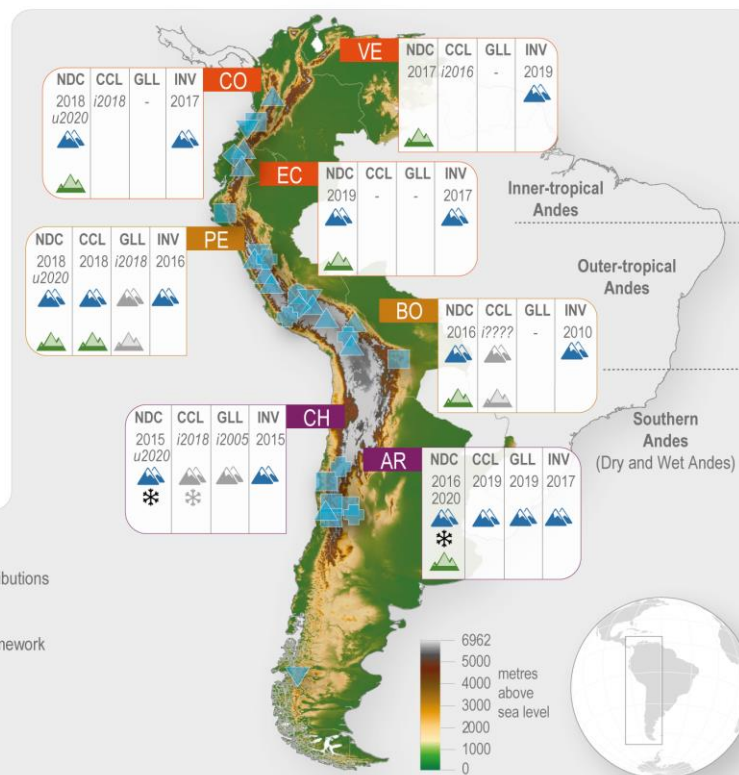


(c) Policies and inventory

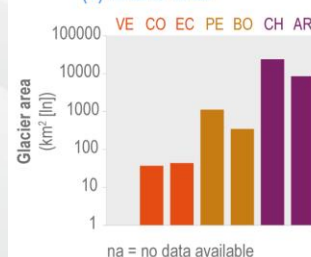
NDC = Submission year(s) of Nationally Determined Contributions
 CCL = Climate change law
 GLL = Glacier law
 INV = Last national glacier inventory

u = update
 i = initialized framework

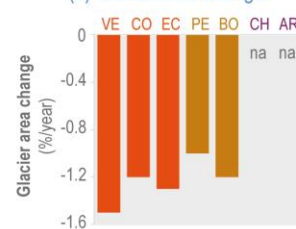
■ Glaciers
 * Snow
 ▲ Mountain ecosystems
 Grey colour = not come into force



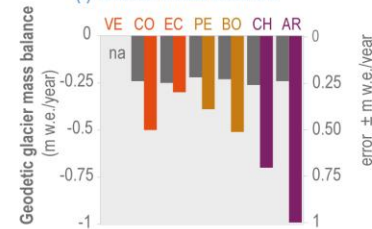
(d) Glacier area

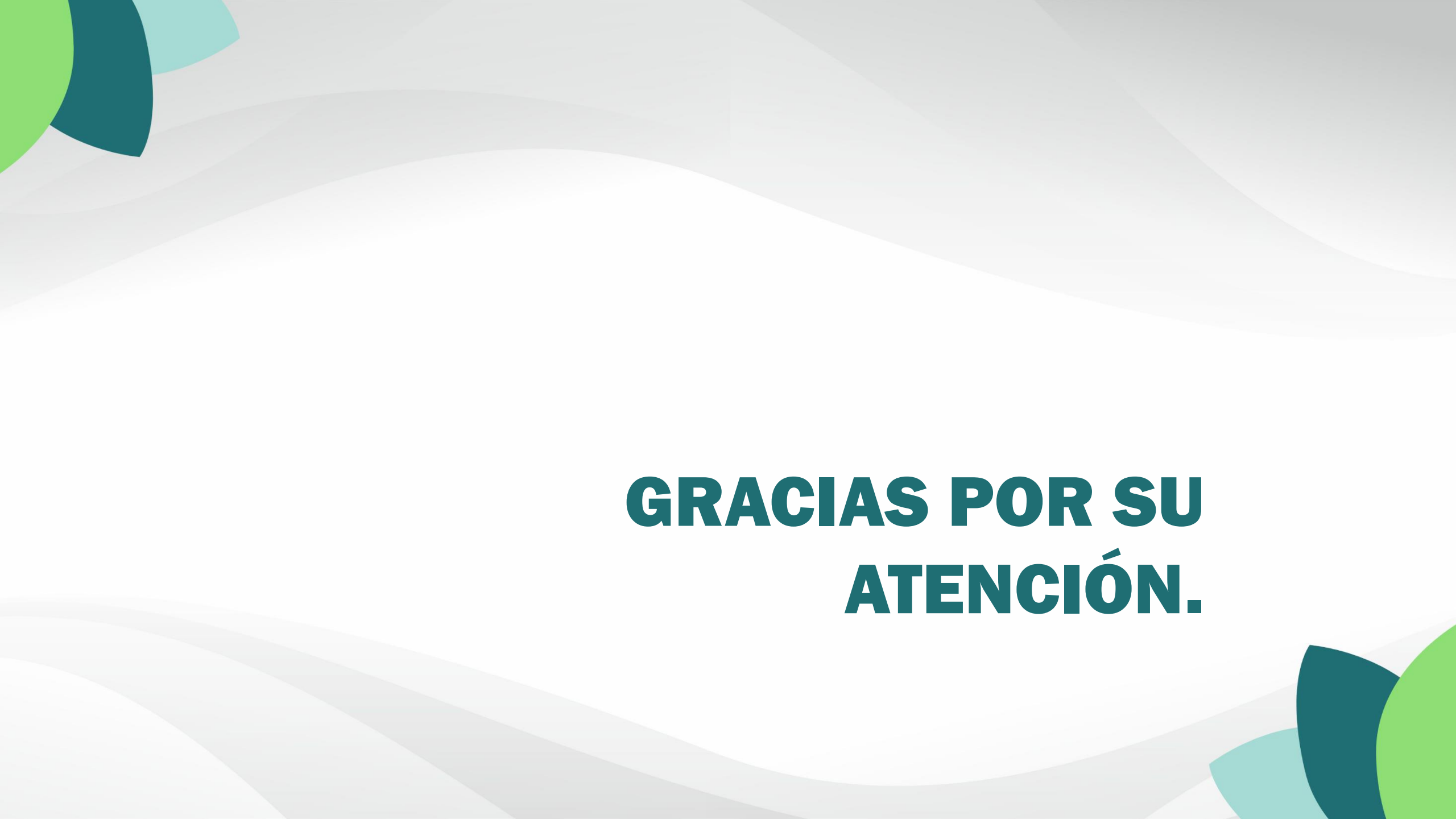


(e) Glacier area change



(f) Glacier mass balance





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