The coupled evolution of urban growth and landslide risk: Lessons from a century of disasters in Medellín, Colombia

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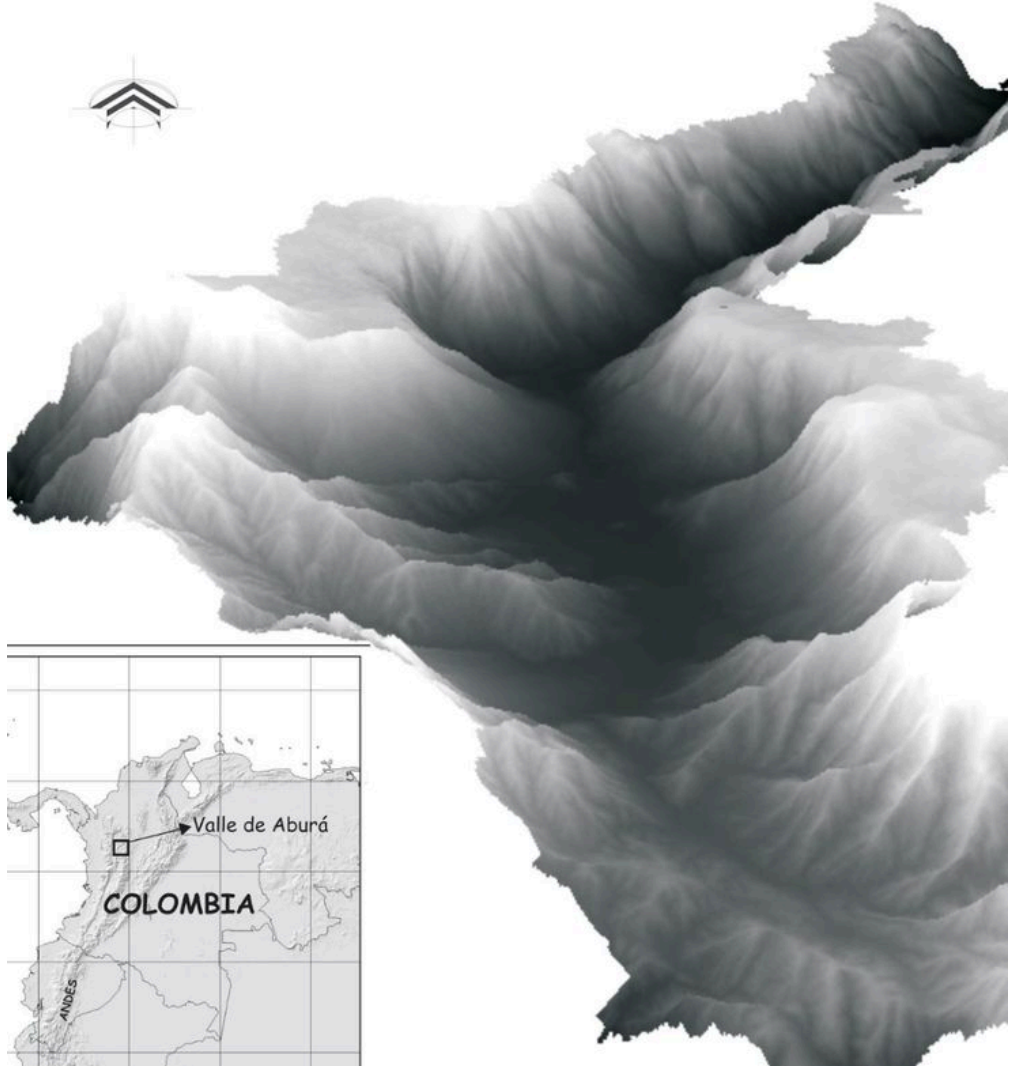
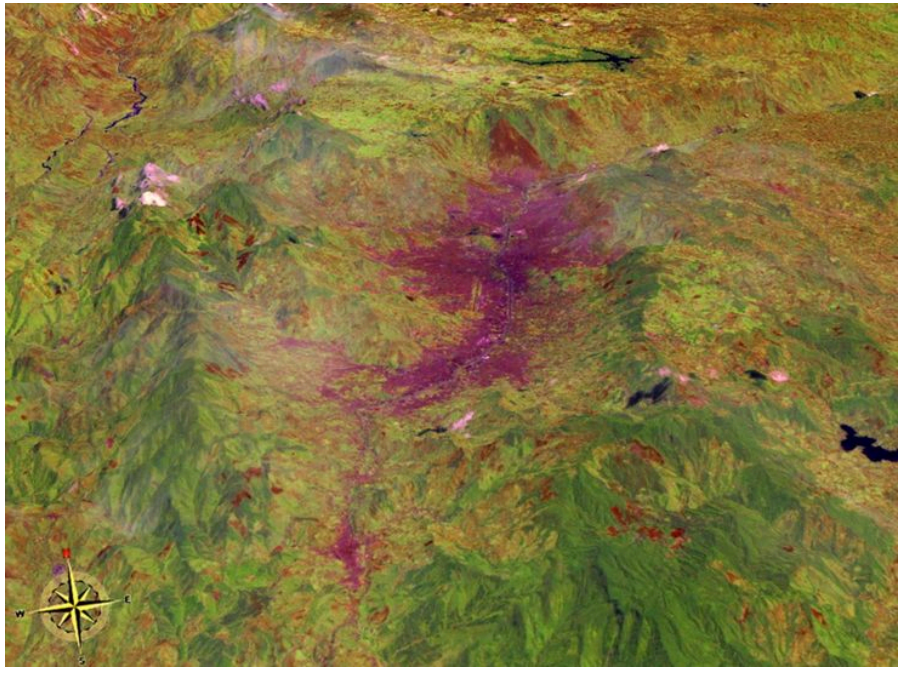
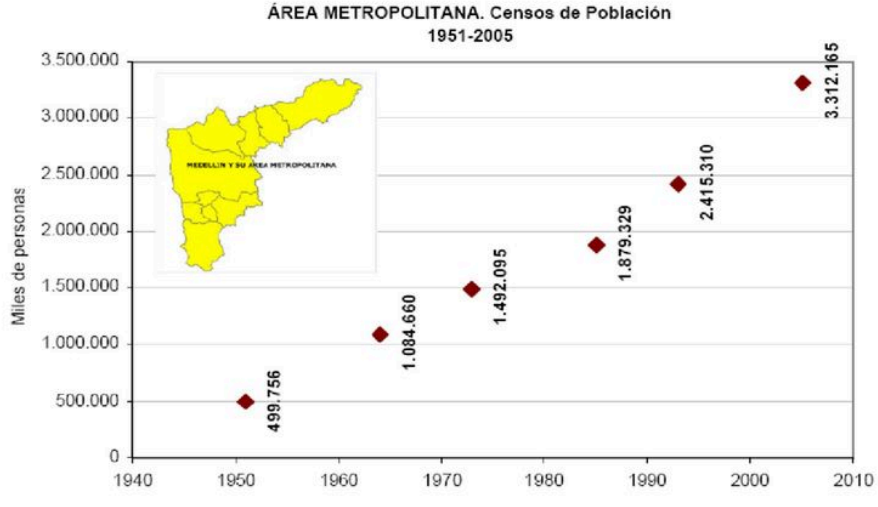
Medellín location

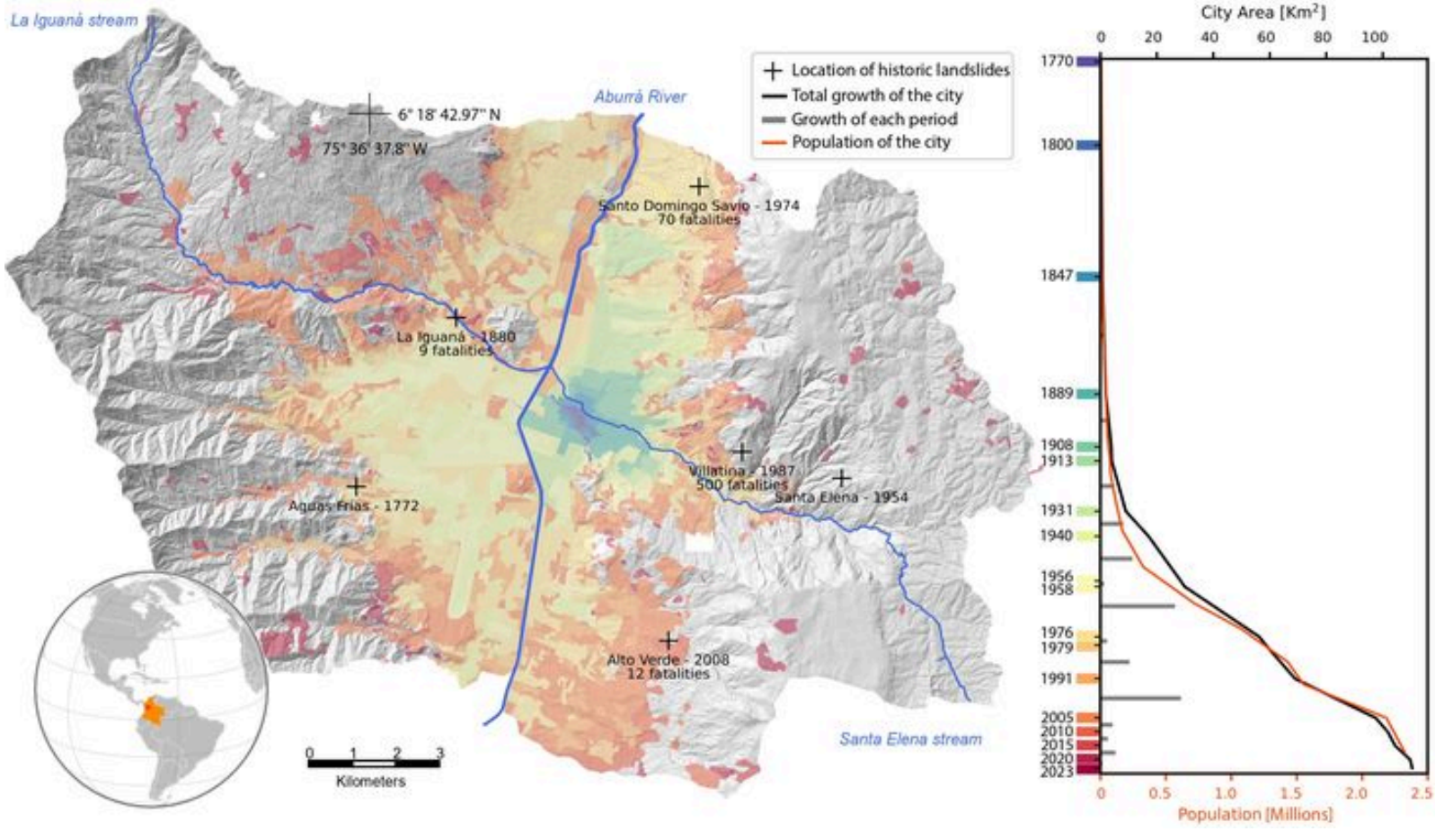


Urban pressure in a constrained valley

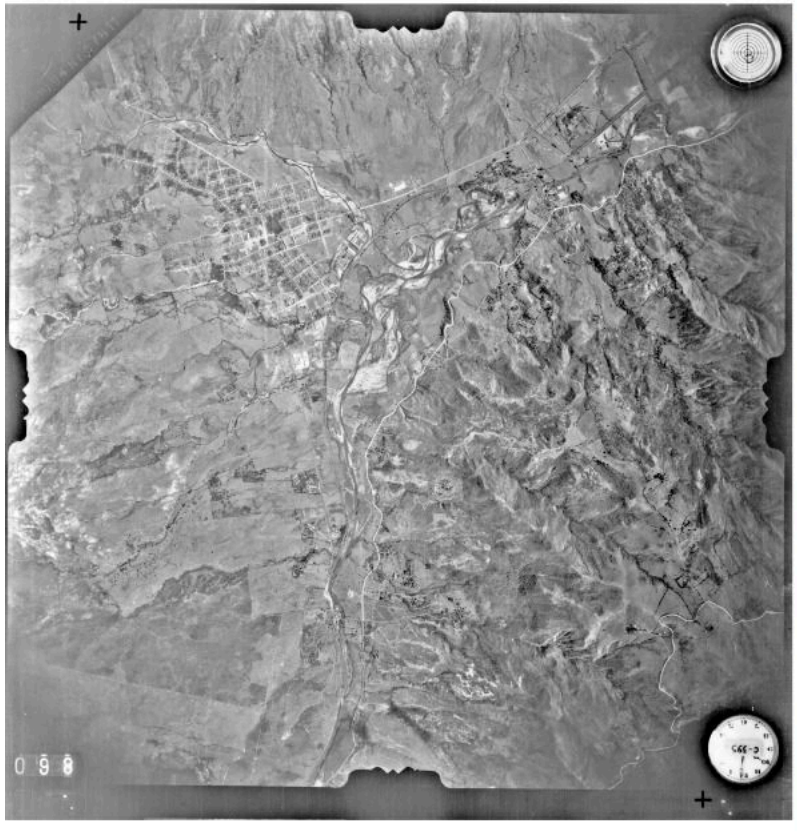




The Urban Explosion (1951–2005)

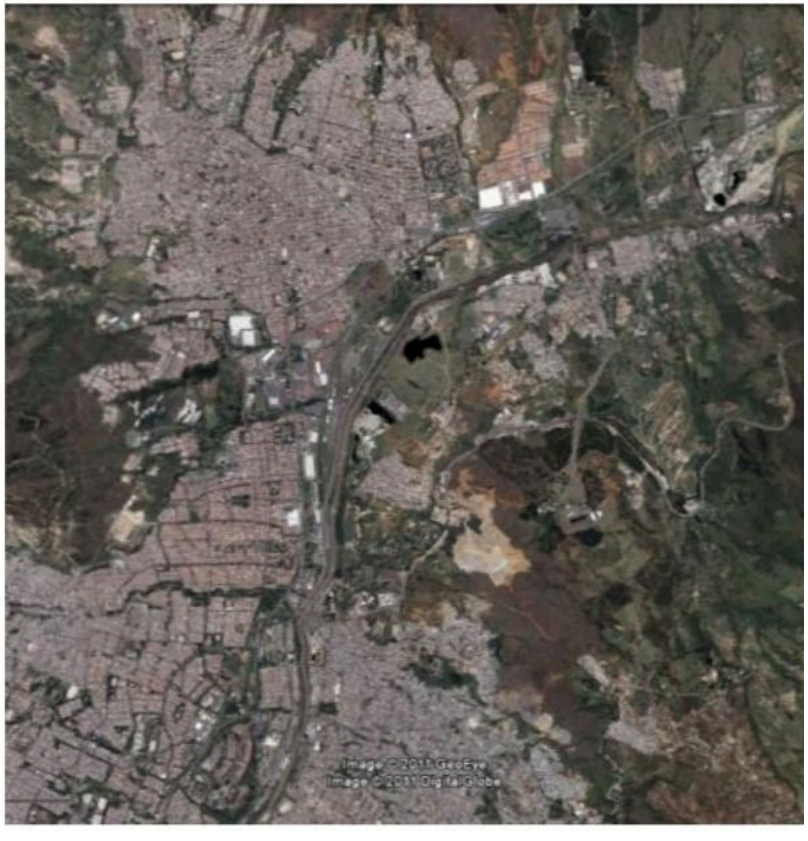


Spatiotemporal evolution of the urban footprint



1943

Fuente : Corantioquia



2008

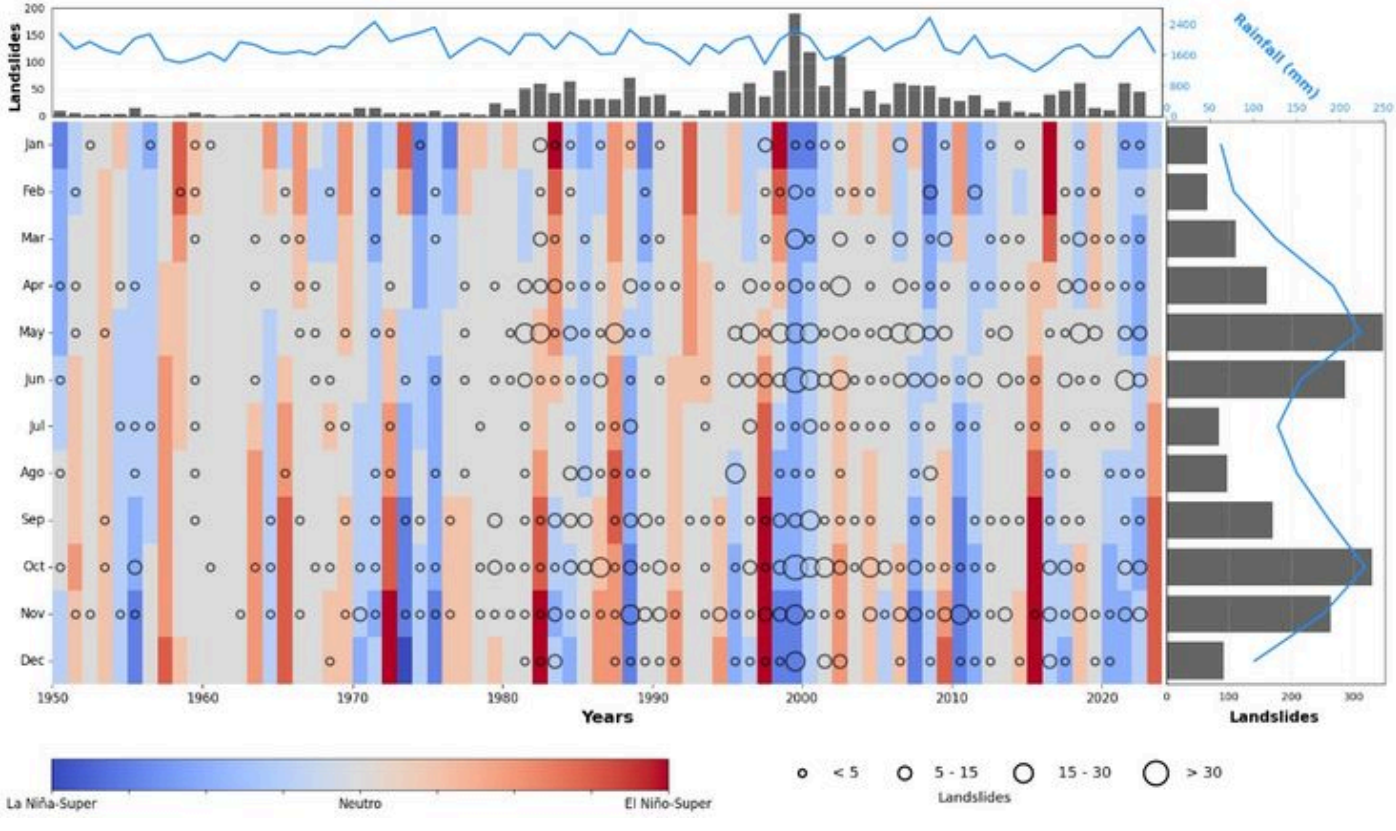
Tomado de Google

Medellín: A City Climbing the Walls

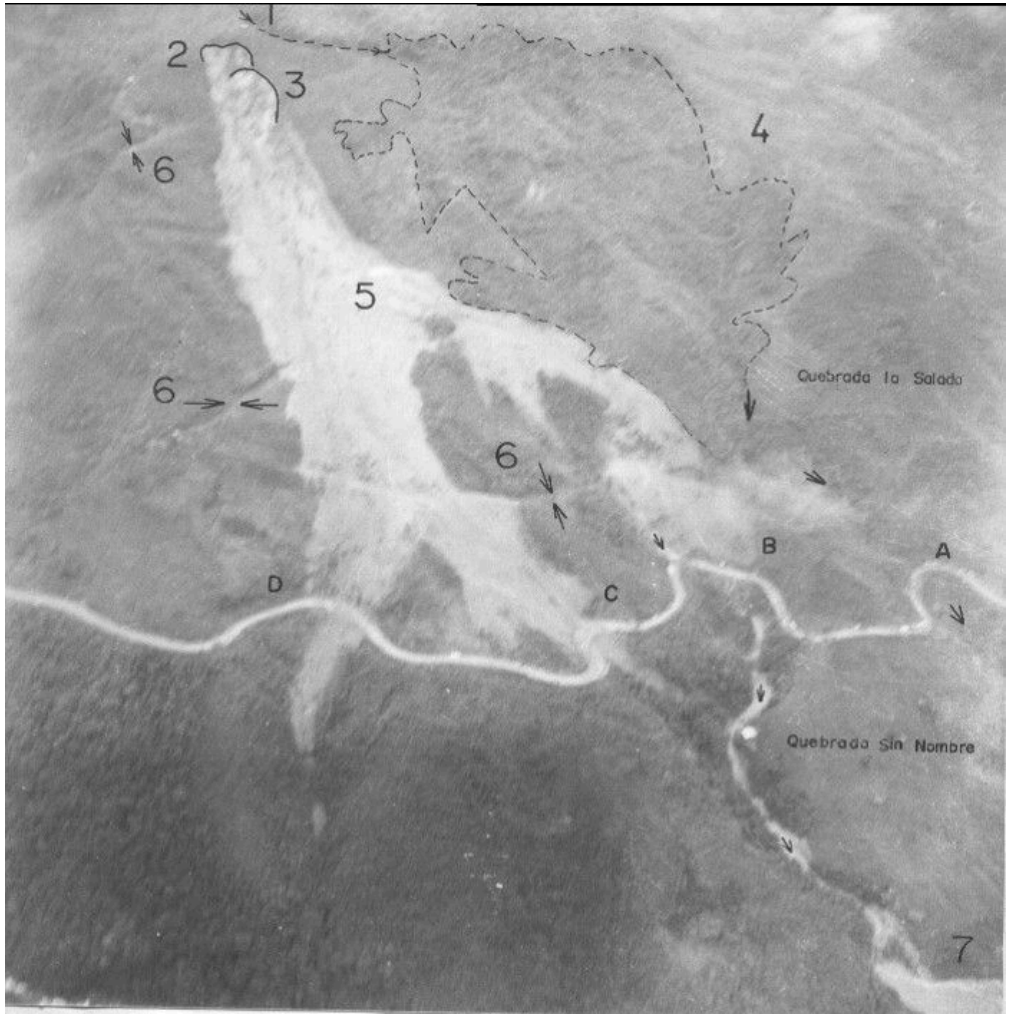
- Rapid, often **informal** expansion over the last 80 years.
- The flatlands are full; growth is pushed onto steep, unstable flanks.

High urbanization pressure meets high landslide susceptibility.

Compounding Drivers: Urban vulnerability & Rainfall



Media Luna (1954), >200 fatalities

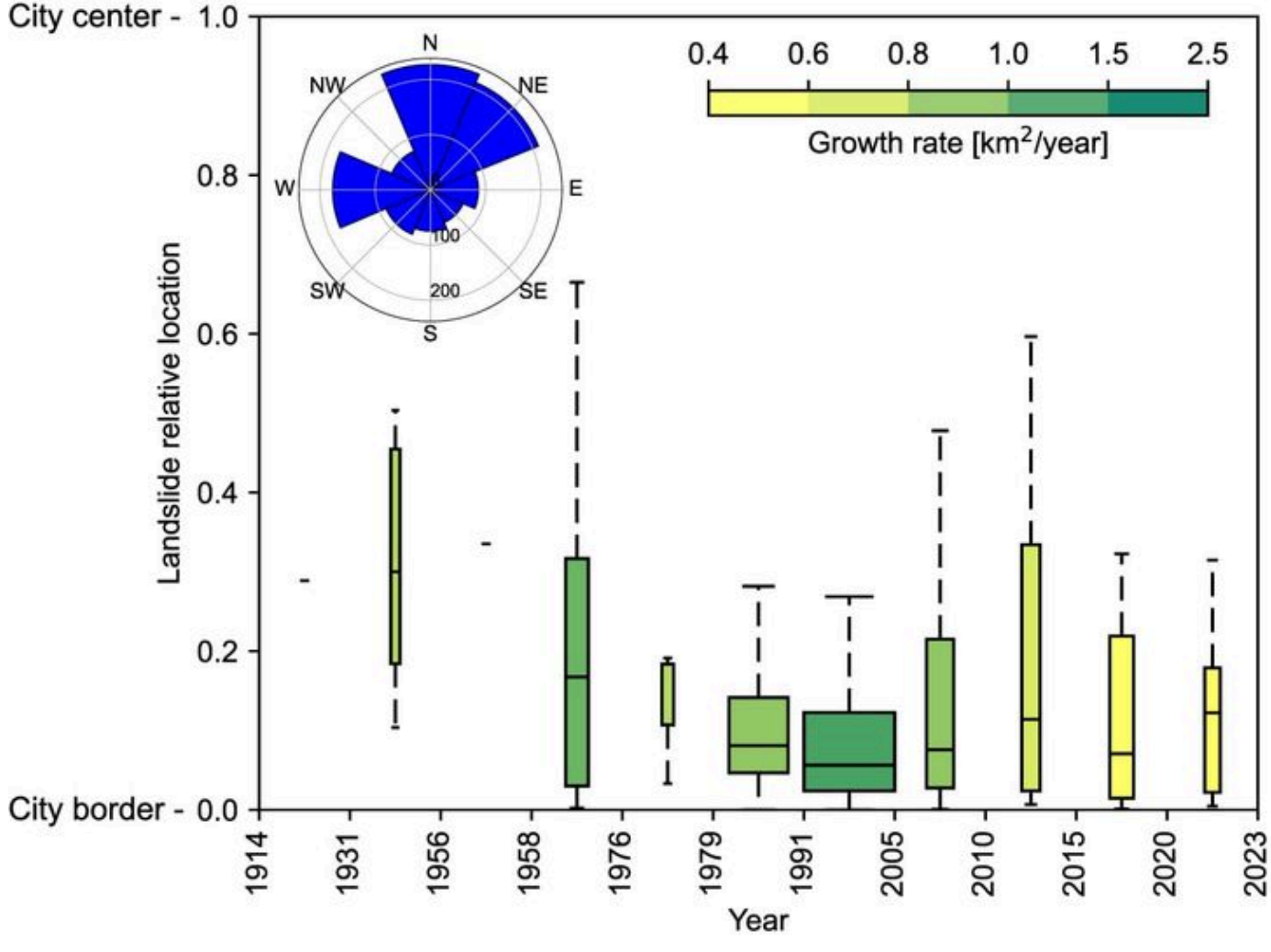


Villatina (1987), >500 fatalities

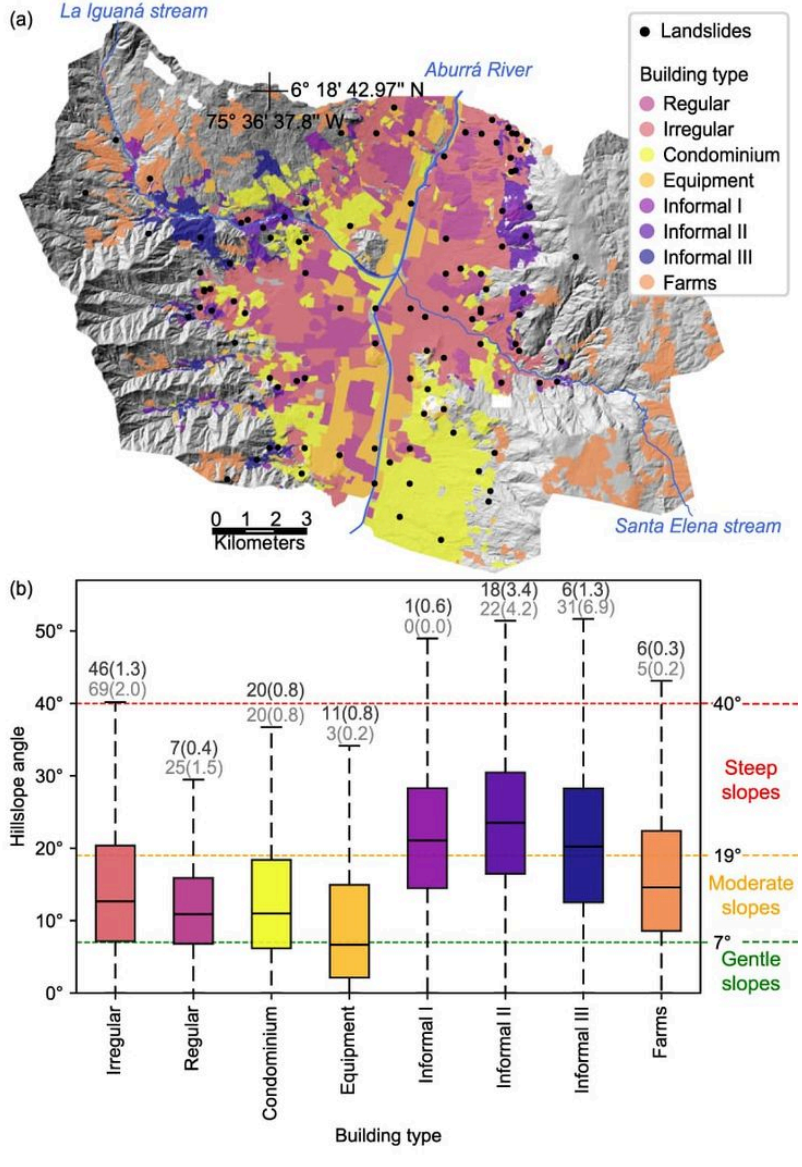
La Gabriela (2010), 97 fatalities

Granizal (2025), 27 fatalities

Migration of risk to the urban fringe



Marginalized on the margins: Inequality in landslide exposure



Alto Verde (2008), 17 fatalities

Take-Home Messages

- Urbanization is not just occupying hazardous ground; it is actively **modifying and amplifying** susceptibility, especially in informal contexts.
- Static zoning based only on geology is insufficient. We need dynamic policies that address *how* settlements are built on the urban fringe.

¡Gracias!

https://edieraristizabal.github.io/Presentaciones/AGU2025_Medellin.html

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