Introduction to Climate Risk/ Vulnerability Assessment framework

What happened to the Ozone layer?

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Atmospheric Chemistry and Physics

What would have happened to the ozone layer if chlorofluorocarbons (CFCs) had not been regulated?

P. A. Newman[1], L. D. Oman[2], A. R. Douglass[1], E. L. Fleming[3], S. M. Frith[3], M. M. Hurwitz[4], S. R. Kawa[1], C. H. Jackman[1], N. A. Krotkov[5], E. R. Nash[3], J. E. Nielsen[3], S. Pawson[1], R. S. Stolarski[1], and G. J. M. Velders[6]

[1]NASA Goddard Space Flight Center, Greenbelt, Maryland, USA
[2]Johns Hopkins University, Baltimore, Maryland, USA
[3]Science Systems and Applications, Inc., Lanham, Maryland, USA
[4]NASA Postdoctoral Program, NASA Goddard Space Flight Center, Greenbelt, Maryland, USA
[5]Goddard Earth Sciences and Technology Center, University of Maryland, Baltimore County, Baltimore, Maryland, USA
[6]Netherlands Environmental Assessment Agency, Bilthoven, The Netherlands

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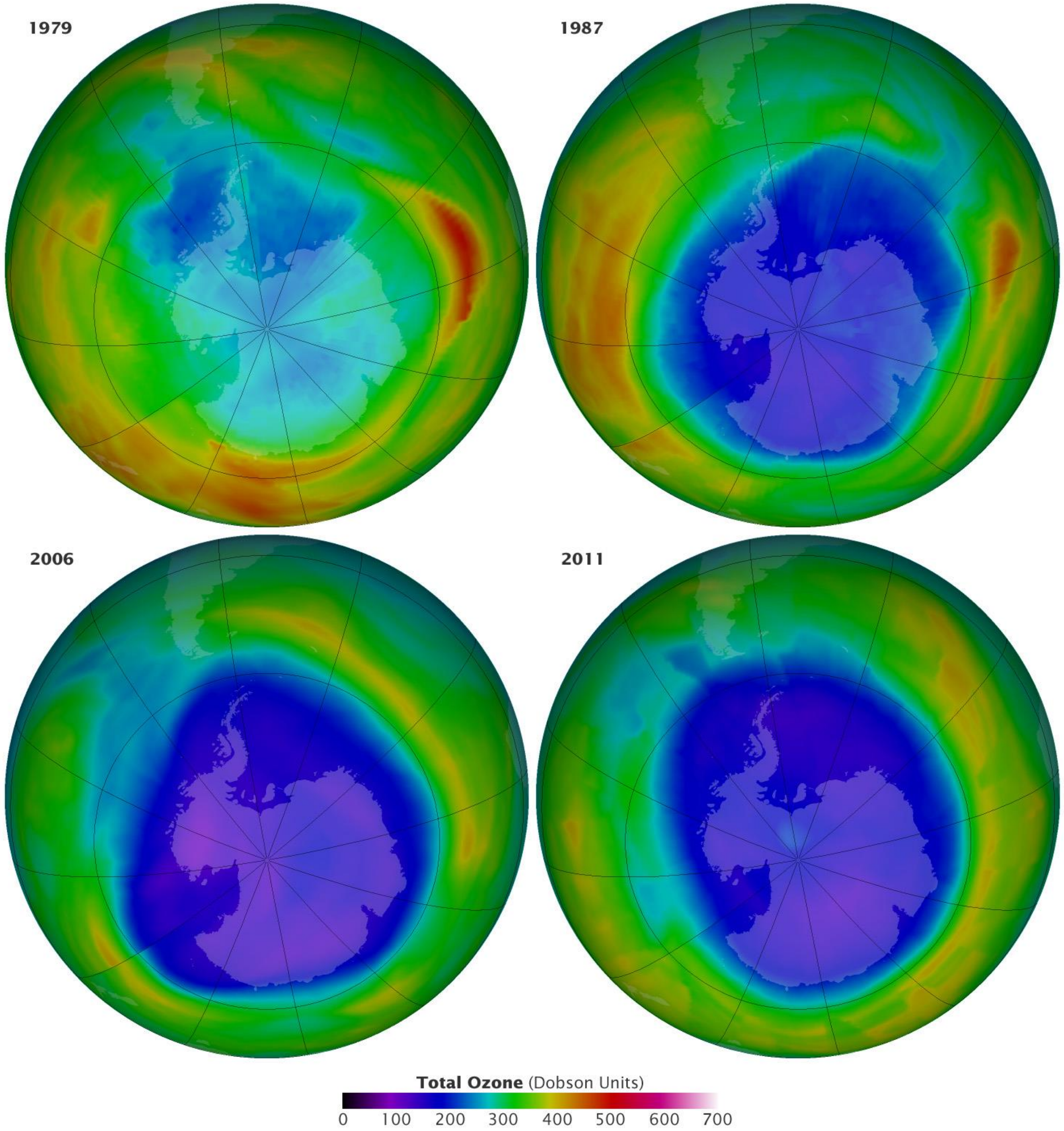
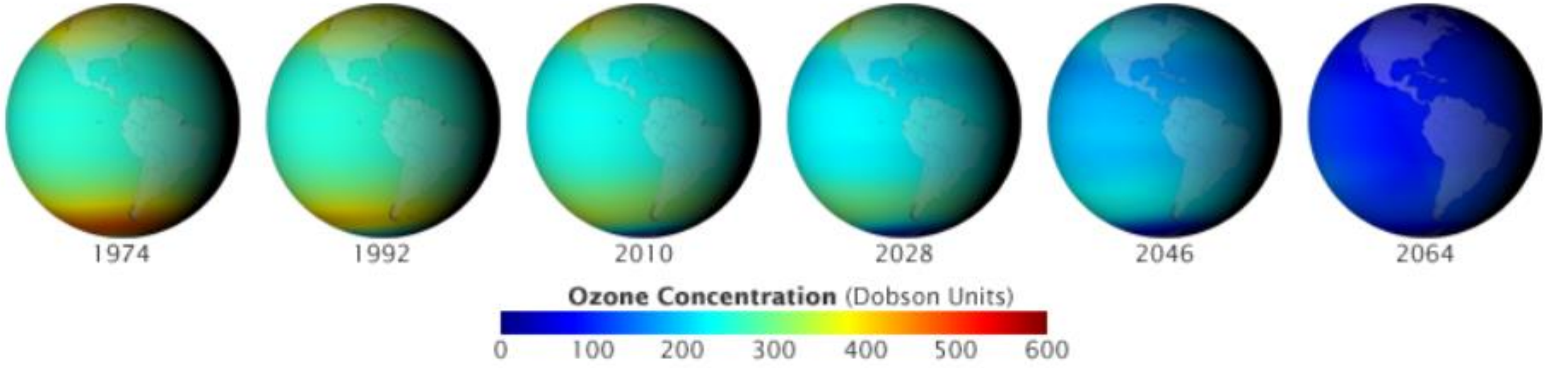
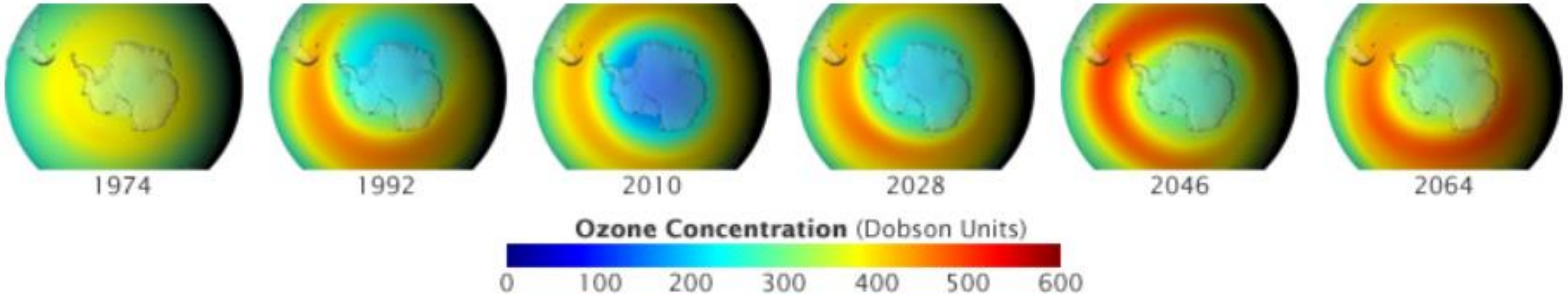


About Montreal Protocol 1987



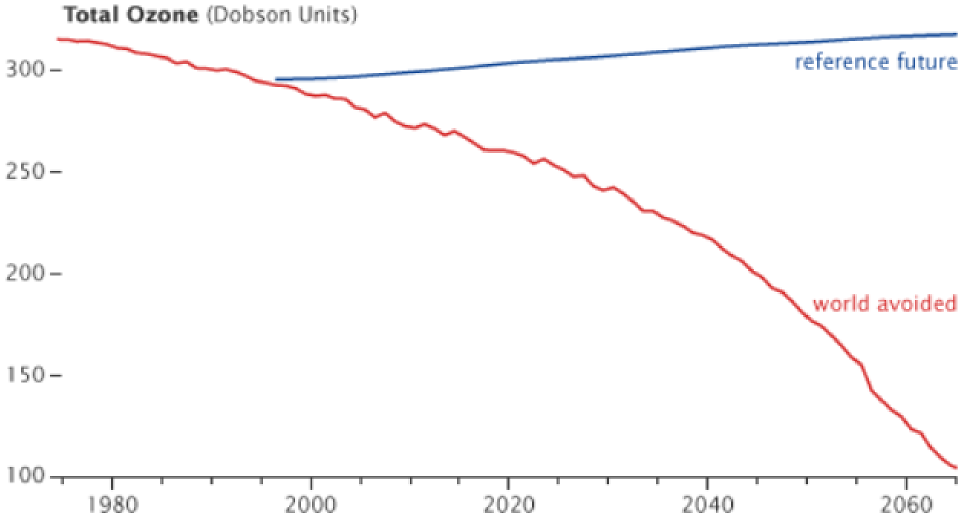
With continued production of CFCs, ozone levels worldwide would have dropped to dangerously low levels. (NASA images by the GSFC Scientific Visualization Studio.)

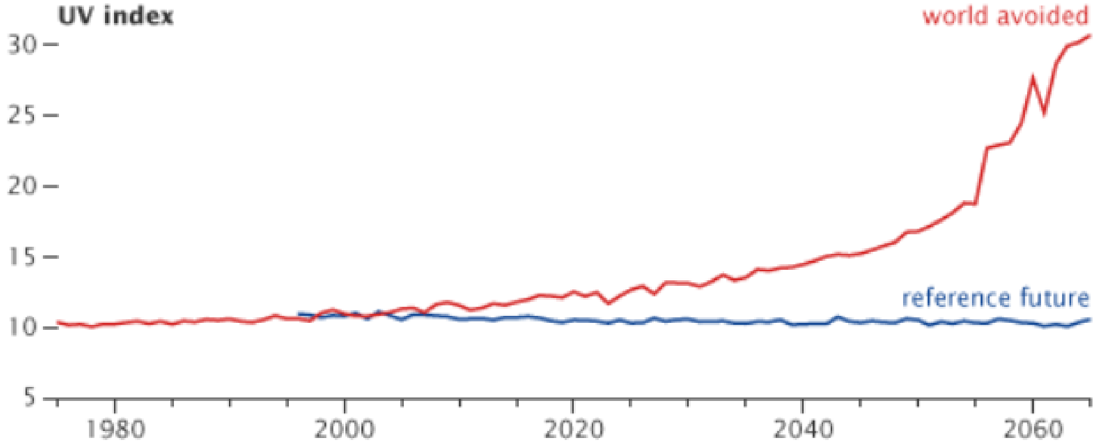


The Antarctic ozone hole (blue areas), which first appeared in the early 1980s and peaked in the 2000s, is expected to shrink markedly by 2064. International agreements successfully mitigated the threat posed by CFCs and other ozone-destroying chemicals. (NASA images by the GSFC Scientific Visualization Studio.)

https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol

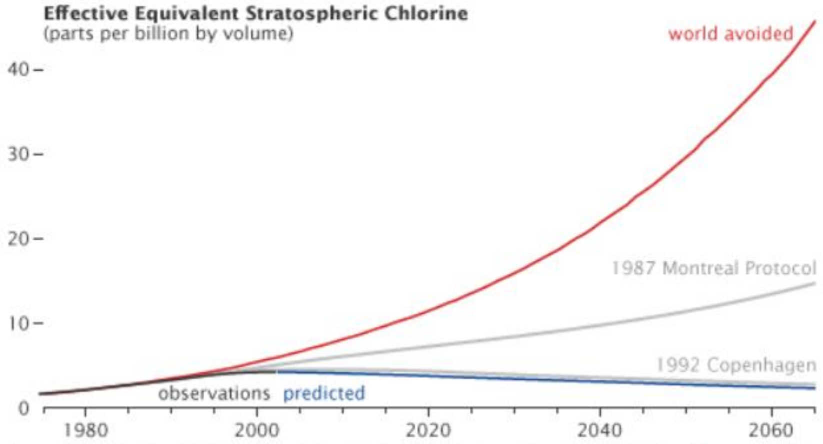
Model





The Real World

The real world has been somewhat kinder. Production of ozone-depleting substances was finally halted in 1992, though their abundance is only beginning to decline because the chemicals can reside in the atmosphere for 50 to 100 years. The peak abundance of CFCs in the atmosphere occurred around 2000, and has decreased by roughly 4 percent to date.



The Nobel Prize in Chemistry 1995

Photo from the Nobel Foundation archive.

Paul J. Crutzen

Prize share: 1/3

Photo from the Nobel Foundation archive.

Mario J. Molina

Prize share: 1/3

Photo from the Nobel Foundation archive.

F. Sherwood Rowland

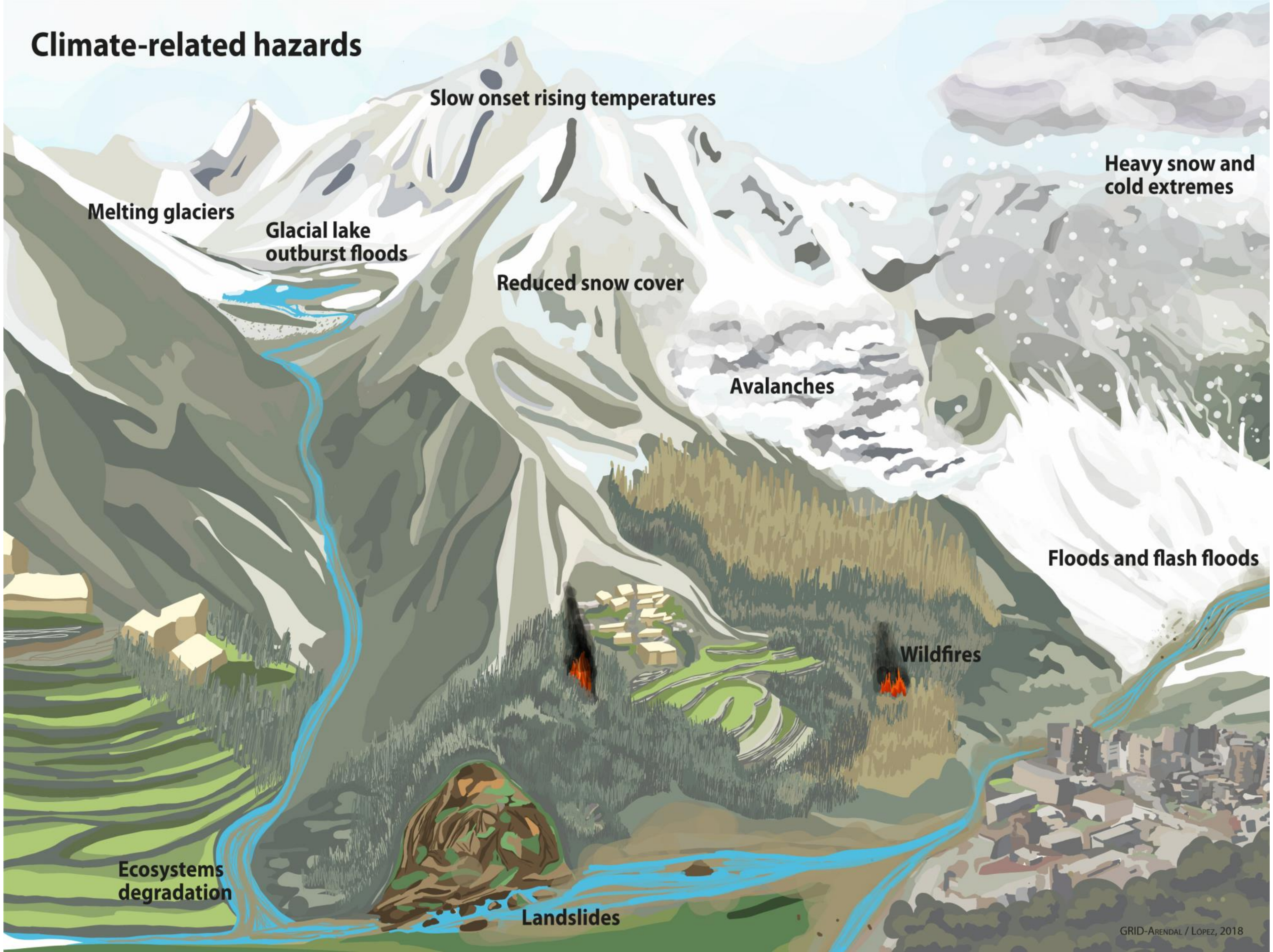
Prize share: 1/3

The Nobel Prize in Chemistry 1995 was awarded jointly to Paul J. Crutzen, Mario J. Molina and F. Sherwood Rowland "for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone"

From the global to local

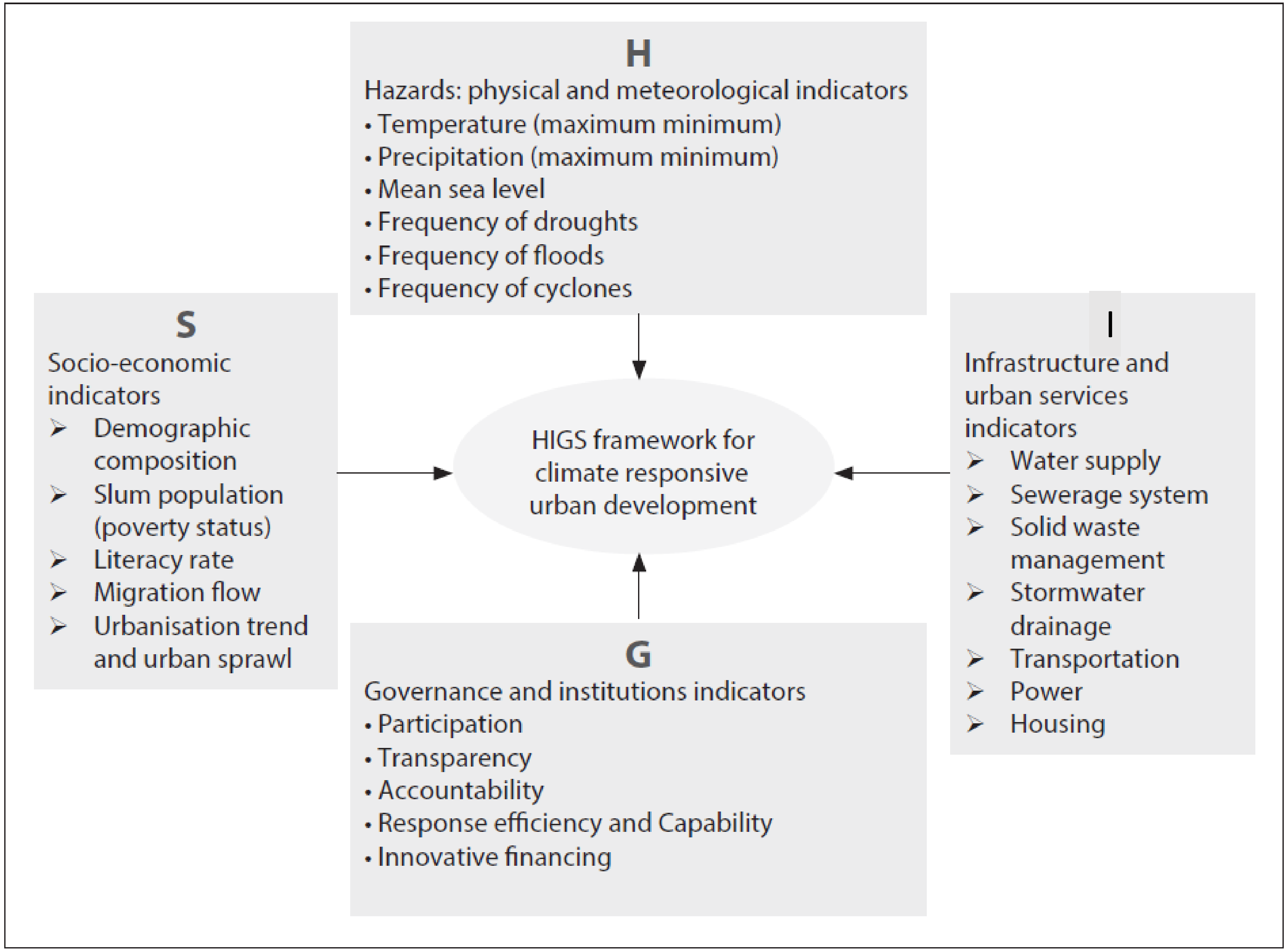
- Identification of risks
- Vulnerability assessment

Rapid Vulnerability Assessment (RVA) framework, based on parameters such as topography, disaster trends, climate scenarios and projections, the status of infrastructure and governance, has been used to assess disaster vulnerability of the Indian Himalayan Region (IHR) city Shillong, Meghalaya.


Climate-related hazards
Slow onset rising temperatures
Heavy snow and
cold extremes
Melting glaciers
Glacial lake
outburst floods
Reduced snow cover
Avalanches
Floods and flash floods
Wildfires
Ecosystems
degradation
Landslides
GRID-Arendal / López, 2018

Hazards and extreme events: Exposure to geophysical variables; past history of hazards, their frequency of occurrence and magnitude of impact. Climate variables observed and projected.
Infrastructure status: Water supply, waste management, storm-water drainage system, power and transport infrastructure, status of the building and services infrastructure, maintenance, coverage and access to the basic infrastructure.
Governance: The institutional framework of the city management, urban administration, public health, recovery system and evaluation of city management in the context of disaster proneness, financial status/independence of the ULBs, and efficiency in delivering the basic services. Smart initiatives like E-governance, ICT (Information and Communication Technology)
Socio-economic conditions: Population and urbanisation trends, urban population density and slum population.

Figure 3: HIGS Framework and Detailed List of Variables



Source: Asian Cities Resilience, IIED & IRADe https://irade.org/10657IIED.pdf, as accessed on June 29, 2021