Willis Towers Watson

Press Release

New satellite data reveals increasing proportion of population exposed to floods worldwide

Breakthrough technology by Willis Research Network member Cloud to Street enables insurers to better analyse flood risk and offer new types of flood coverage.

LONDON, 11 August 2021 — New research[1] published by Willis Research Network partner Cloud to Street provides ground-breaking insights into rising flood risk globally. Cloud to Street uses direct satellite observations of flooding and refines this geospatial data with machine learning, AI and other methods instead of modelled estimates which are widely used in the insurance industry.

The research, published as the Global Flood Database, offers a comprehensive view of flood exposure around the world and underscores how alternative methods of analysing flood risks through platforms like Cloud to Street allows insurers to understand flooding in a new and revolutionary way. The entire database is hosted openly at Global-flood-database.cloudtostreet.ai.

The analysis reveals that the proportion of global population exposed to floods has grown by 24% since the turn of the millennium, a tenfold difference from what scientists previously thought. Growing exposure and a growing number of flood events are behind the rapid increase, according to the research.

Since Cloud to Street joined the Willis Research Network in 2020, the partnership has worked to address the insurance gap in the developing world, where some 90% of economic losses from disasters remain uninsured, putting economically vulnerable households at greater risk and slowing recovery efforts following disasters.

Today, most flood maps rely on modelling that simulates floods based on available ground data, such as elevation, rainfall and ground sensors. These models are time intensive and can have substantial limitations, entirely missing flooding incidents in regions not historically prone to flooding. This leads to a large flood insurance coverage gap and low flood insurance penetration worldwide, where coverage is either not available or inadequate.

In contrast, Cloud to Street's Global Flood Database relies on satellite observations of actual flooding over the past two decades, which marks a step change in developing a comprehensive view of global flood risk. This allows additional analyses of the scope, impact, and trends of recent flooding. It represents a major advancement in the field of flood mapping and is essential to capture climate change's accelerating, record-breaking disasters, while also enabling greater flood insurance penetration worldwide.

Bessie Schwarz, CEO and Co-founder of Cloud to Street, said: "More people and more assets are impacted by flooding than any other climate-fuelled disaster. The Global Flood Database will help insurers understand the changing nature of flood risk and offer more competitive insurance coverage. We are proud to enable governments and insurers to protect millions of people and billions in assets they have never been able to before."

[1] https://doi.org/10.1038/s41586-021-03695-w

Press Release

Simon Young, a senior director in the Climate and Resilience Hub at Willis Towers Watson added “The collaboration between Cloud to Street and the Willis Research Network is already delivering beyond our expectations, particularly in the research and development of tools to better understand flood risk and mitigate the economic impact of flooding for communities throughout the world. Alongside our Willis Re and Alternative Risk Transfer units, the Climate and Resilience Hub is also creating innovative parametric solutions building on this rapidly evolving flood mapping technology.”

The researchers looked at daily satellite imagery to estimate both the extent of flooding and the number of people exposed to over 900 large flood events between 2000 and 2018. They found that between 255 and 290 million people were directly affected - and between 2000 and 2015, the number of people living in these flooded locations increased by 58-86 million.

Further findings from the research:

- By 2030 the model estimates that climate and demographic change will add 25 new countries to the 32 already experiencing increasing floods.
- Despite representing less than 2 percent of floods, dam breaks had the highest increased incidence (177%) in proportion of population exposed.
- Population growth in flooded areas is driven by people moving into flood-prone areas—and economic development in those regions. Vulnerable populations often have no choice but to settle in flood zones.
- Nearly 90% of flood events occurred in South and Southeast Asia, with the large basins (Indus, Ganges-Brahmaputra, and Mekong) having the largest absolute numbers of people exposed and increased proportions of population exposed to inundation.
- The satellite data also uncovered previously unidentified increases in flood exposure in Southern Asia, Southern Latin America, and the Middle East.

It is hoped that the database will provide a unique and credible benchmark for the insurance industry to assess flood risks, both from an aggregated annual average loss perspective, as well as single extreme loss-making floods. This can be useful for reinsurance practices undertaken by Willis Re, involving model comparison, developing new views of flood risk, and testing the efficiency of various reinsurance structures. It can equally be used to support disaster resilience and post-event analysis as the insurance industry and governments prepare for, and respond to, large-scale flooding in all parts of the world.

As flood risk is expected to increase through population changes and urbanisation, overlaid onto a background trend driven by climate change, the dataset will provide an ongoing and essential view of risk to support humanitarian and risk management efforts.

About the Research

The study was led by scientists at Cloud to Street, a global flood tracking and risk analytics platform for disaster managers and insurers, who have been members of the Willis Research Network since May 2020. Co-authors from NASA, Google Earth Outreach, University of Arizona, Columbia University, University of Michigan, University of Colorado, University of Texas at Austin, and the University of Washington have helped to develop the Global Flood Database, which is the key output from the research. The database sets a new standard for

Willis Towers Watson

Press Release

providing a view of the true scope of flood risk as the largest and most accurate dataset of observed historical floods in existence.

About Cloud to Street

Cloud to Street is the leading authority on remote flood analytics, using satellites and AI to monitor flood risk and track flooding anywhere on Earth in near real time. We fuse data from more than 15 satellites as well as other, non-conventional sources to enable governments to leapfrog legacy flood information systems and help insurers to accurately underwrite flood risk with new products such as parametric insurance.

That's why leading global organisations like the UN World Food Programme and Willis Towers Watson partner with us to monitor and protect 122 million people living in flood-prone regions. Our investors include Collaborative Fund, Lowercarbon Capital, Floating Point, and Mercy Corps, enabling us to expand the technology to even more flood-prone communities and aiding insurers to cover billions of currently unprotected assets worldwide.

About Willis Research Network

The Willis Research Network (WRN**)** is an award-winning collaboration, which harnesses over 60 partners in science, academia, think tanks, and the private sector to form innovative partnerships with the risk management and insurance industries; supports and influences science to improve the understanding and quantification of risk and opportunities for the benefit of our clients and society.

About Willis Towers Watson

Willis Towers Watson (NASDAQ: WLTW) is a leading global advisory, broking, and solutions company that helps clients around the world turn risk into a path for growth. With roots dating to 1828, Willis Towers Watson has 45,000 employees serving more than 140 countries and markets. We design and deliver solutions that manage risk, optimise benefits, cultivate talent, and expand the power of capital to protect and strengthen institutions and individuals. Our unique perspective allows us to see the critical intersections between talent, assets, and ideas — the dynamic formula that drives business performance. Together, we unlock potential. Learn more at willistowerswatson.com.

Media contacts

Andrew Collis +44 (0) 7932 725267 | andrew@acolliscommunications.com

Miles Russell +44 (0) 7903 262118 | Miles.Russell@WillisTowersWatson.com