MARSH RE

November 2026

# Istanbul floods:

## Retrospective analysis and future insights using the GCAT™ Türkiye Flood Model

International Peril Advisory
Cat Resource Center



# About the October 2026 Istanbul floods

From October 13 to 17, intense rainfall caused significant flooding across parts of Türkiye, particularly Istanbul. A low-pressure system over the eastern Mediterranean interacted with an upper-level trough extending from the Balkans, drawing moisture-laden northeasterly winds across the Black Sea. Atmospheric instability and persistent rain bands generated prolonged heavy rainfall, potentially enhanced by coastal convergence and local topography.

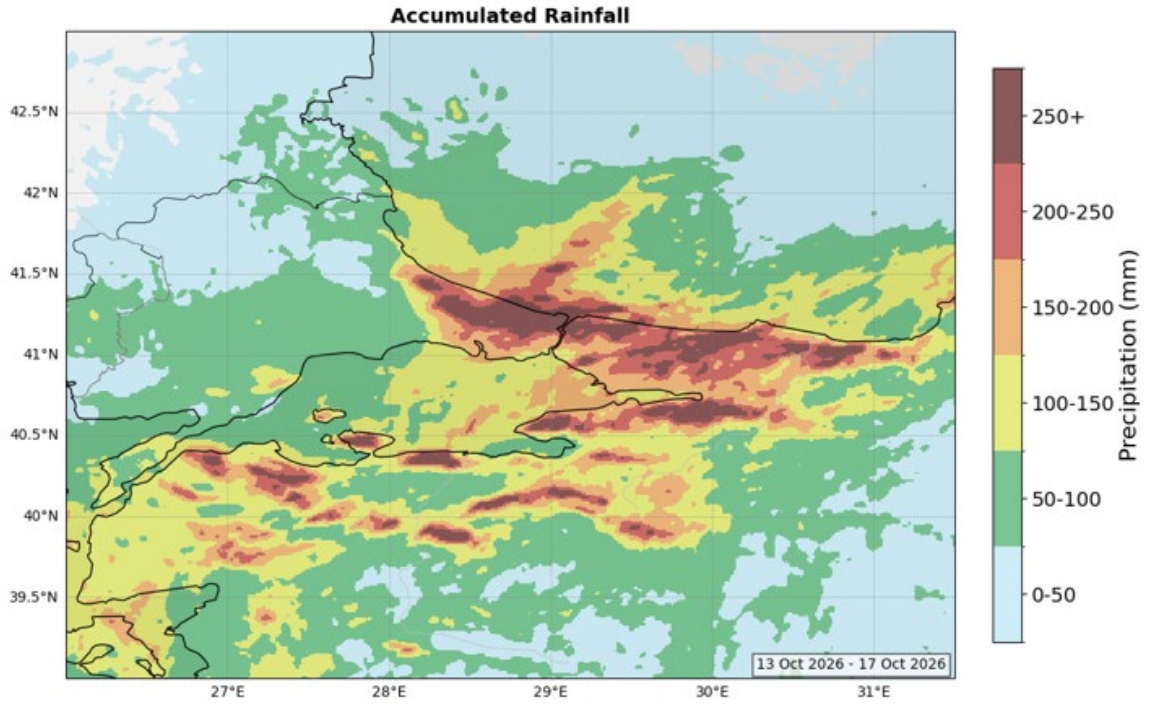



**Figure 1:** Modeled accumulated precipitation (mm) from October 13 to 17, derived from the Meteomatics EURO1k high-resolution weather model (1 km spatial resolution).

Source: Meteomatics


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# Record rainfall observations

Rainfall observations recorded 274.4 mm at Beykoz in northern Istanbul over 48 hours between October 14 and 15[1], while modeled accumulations exceeded 400 mm in parts of northern Istanbul from October 13 to 17. Marsh Re analysis of maximum daily rainfall against historical European Climate Assessment & Dataset (ECA&D) precipitation data indicates 1-day rainfall return periods exceeding 100 years at several locations across the affected region, highlighting the exceptional local severity of the event.[2]

1. Anadolu Agency (2026). İstanbul sonbaharın ilk iki ayında aldığı yağıştan fazlasını iki günde gördü, 16 October 2026. Based on Turkish Meteorological Service (MGM) observations

2. Marsh Re (2026). Internal analysis of maximum 1-day precipitation return periods during October 14 to 17, using historical daily precipitation data from the ECA&D. Dataset reference: Klein Tank, A.M.G. et al. (2002). "Daily dataset of 20th-century surface air temperature and precipitation series for the European Climate Assessment". *International Journal of Climatology*, 22, 1441–1453. https://doi.org/10.1002/joc.773

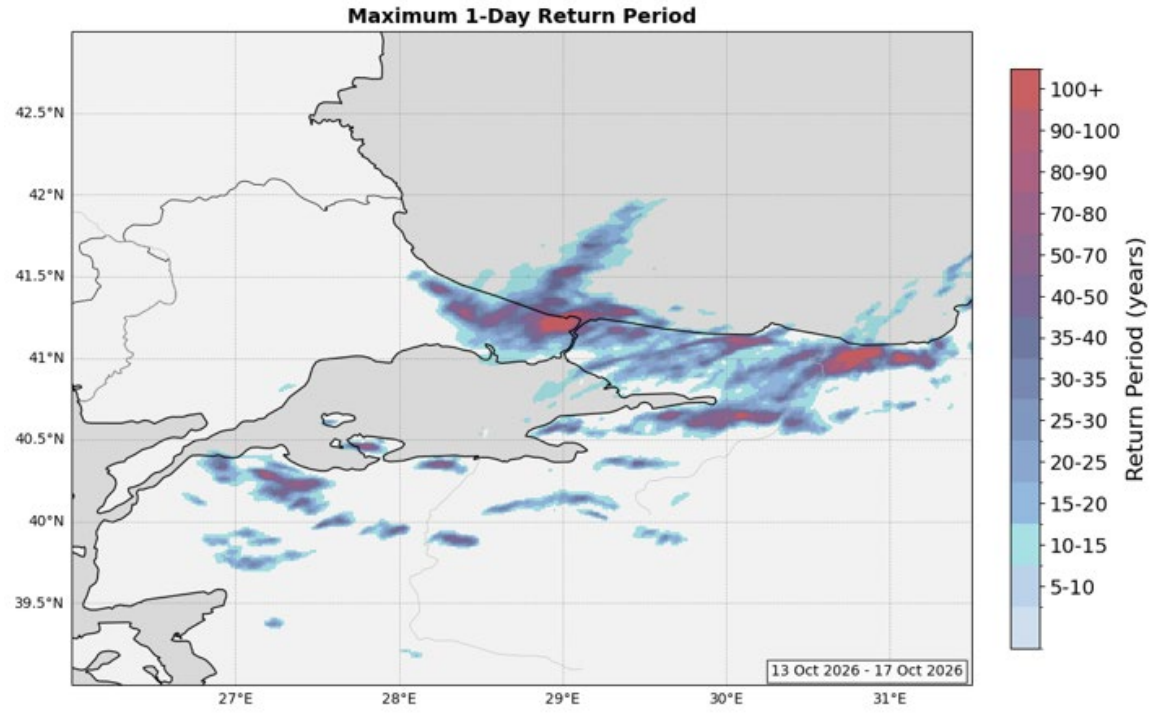



**Figure 2:** Estimated return periods of maximum 1-day precipitation from October 13 to 17, based on Marsh Re analysis of historical ECA&D daily precipitation data.

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Source: Marsh Re

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# A history of flooding in Türkiye

**November 1995: Southern Türkiye floods**

- Daily record of 210 mm

**September 2009: Marmara floods**

- Daily accumulations of 248 mm

**October 2026: Istanbul floods**

- Modeled accumulations exceed 250 mm

Türkiye has experienced similarly intense rainfall historically, including the September 2009 Marmara floods, associated with daily accumulations of 248 mm, and severe flooding in southern Türkiye in November 1995, when 210 mm was recorded in a day.[3] These events illustrate the recurring potential for extreme rainfall, although differences in rainfall duration, location, and associated flood-generating processes complicated direct comparisons.

The interaction of extreme precipitation, local topography, urbanization, and drainage capacity demonstrates the importance of understanding spatial variations in flood hazard across Türkiye.

3. Koç, G., Petrow, T. and Thieken, A.H. (2020). "Analysis of the Most Severe Flood Events in Turkey (1960–2014): Which Triggering Mechanisms and Aggravating Pathways Can Be Identified?" *Water*, 12(6), 1562, Table A1.


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# Insurance market impacts

## Human and economic loss

The flooding claimed nine lives across Istanbul and neighboring Kocaeli and caused significant damage to residential and commercial properties, industrial facilities, and vehicles, with particularly severe impacts in Sarıyer's Ayazağa district.[4] Across Istanbul, Governor Davut Gül reported approximately 3,000 homes and businesses seriously damaged and estimated direct and indirect economic losses of around 10 billion TRY (€180 million).[5] By October 20, the Insurance Association of Türkiye (TSB) reported 3,017 flood-related claims notified to insurers, totaling approximately 4.5 billion TRY (€81 million) in reported claim amounts, comprising 2,041 property and industrial claims and 976 motor claims. These figures remain preliminary and do not represent settled or ultimate insured losses.[6]

## Urban flooding

The concentration of damage in heavily urbanized areas highlights the importance of local catchment characteristics, development along watercourses and drainage capacity in determining flood impacts. Rapid runoff in small urban catchments, alongside the modification of natural drainage channels, can exacerbate flooding, emphasizing the need to characterize both fluvial and pluvial hazards.[7]

## Türkiye's flood protection gap

Although earthquake is Türkiye's peak catastrophe risk, flood may contribute materially to losses at more frequent return periods. Unlike compulsory earthquake insurance under the Turkish Catastrophe Insurance Pool (DASK), flood coverage generally remains voluntary.[8] The Insurance Association of Türkiye (TSB) estimates fire/property insurance penetration in Istanbul at approximately 17% to 20%, compared to 43% for comprehensive motor insurance,[9] indicating a substantial protection gap.

## Complexities in flood risk assessment

Quantifying flood risk through historical experience is challenging. Rapid inflation, exchange-rate movements, changes in rebuilding costs and insured exposure, and limited historical claims data complicate comparisons between events. These factors make it difficult to establish a consistent historical benchmark for flood losses or reliably assess their contribution to portfolio-level risk. These challenges highlight the need for a probabilistic approach that translates local flood hazard, exposure and vulnerability into portfolio-level loss estimates.

4. Anadolu Agency (2026). İstanbul'da selde kaybolan bir kişinin daha cansız bedenine ulaşıldı, 20 October 2026.
5. Anadolu Agency (2026), İstanbul Valisi Gül: İstanbul'da selden etkilenenlerin zararları bugün ödenmeye başlanacak, 19 October 2026. Independent Türkçe (2026). İstanbul Valisi Gül: Sel felaketinde yaklaşık 10 milyar lira zarar oluştu, 20 October 2026
6. Sigorta Kulisi (2026), İstanbul selinde hasar dosyası 3 bini aştı: Sigortalı hasar 4,5 milyar TL seviyesinde, 20 October 2026. Statement by TSB Deputy Secretary General Atilla Oksay.
7. "Istanbul demolishes buildings on flood-hit streambeds." (2026, 18 October). *Hürriyet Daily News.*
8. Turkish Catastrophe Insurance Pool (DASK), Compulsory Earthquake Insurance – Guarantees and Coverage.
9. Sigorta Kulisi (2026), Atilla Oksay, 20 October 2026.


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# GCAT Türkiye Flood Model

## Building better risk assessment

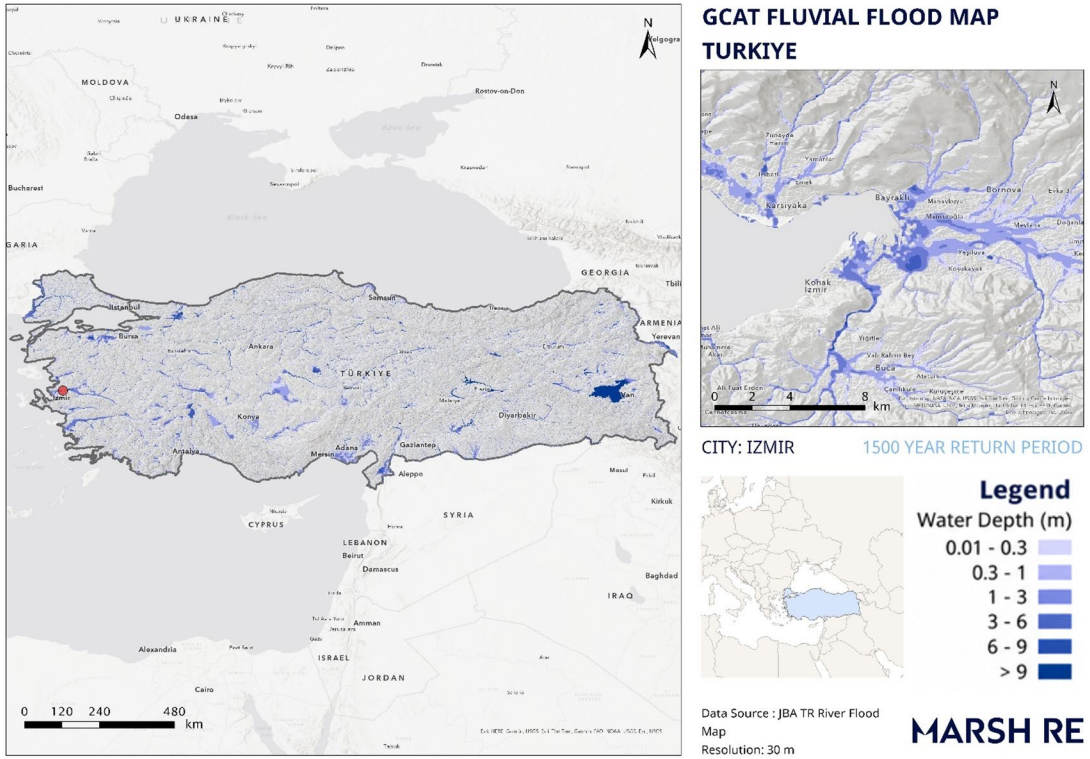






**Figure 3:** GCAT Model domain

**The model, now is in its final stage of development, has an estimated release date of January 2027.**

Developed specifically for Türkiye, the GCAT Türkiye Flood Model provides a framework for assessing risks and supports various processes, including reinsurance pricing, capital assessment, accumulation control and portfolio management.

- High-resolution hazard assessment combines 30-meter flood hazard maps, 10,000 years of stochastic precipitation and discharge simulations, enhanced flood defenses incorporating probabilistic defense-breach scenarios, and land-use data – capturing both fluvial and pluvial flood risk across Türkiye.
- The model's vulnerability functions are based on a comprehensive review of scientific literature and historical data, covering residential, commercial, industrial, agricultural, and municipal exposures, as well as motor hull risks.
- Expert insights: Locally based Marsh Re experts and Global Model Development Team collaborated to generate model calibration and benchmarking, informed by data representing more than 50% of Türkiye's property-market exposure.

Accounting for climate change, the model can assess flood risk under future climate conditions using an ensemble of regional climate model simulations. Assessments can be conducted under several global warming scenarios: +1.5°C, +2.0°C, and +3.0°C.

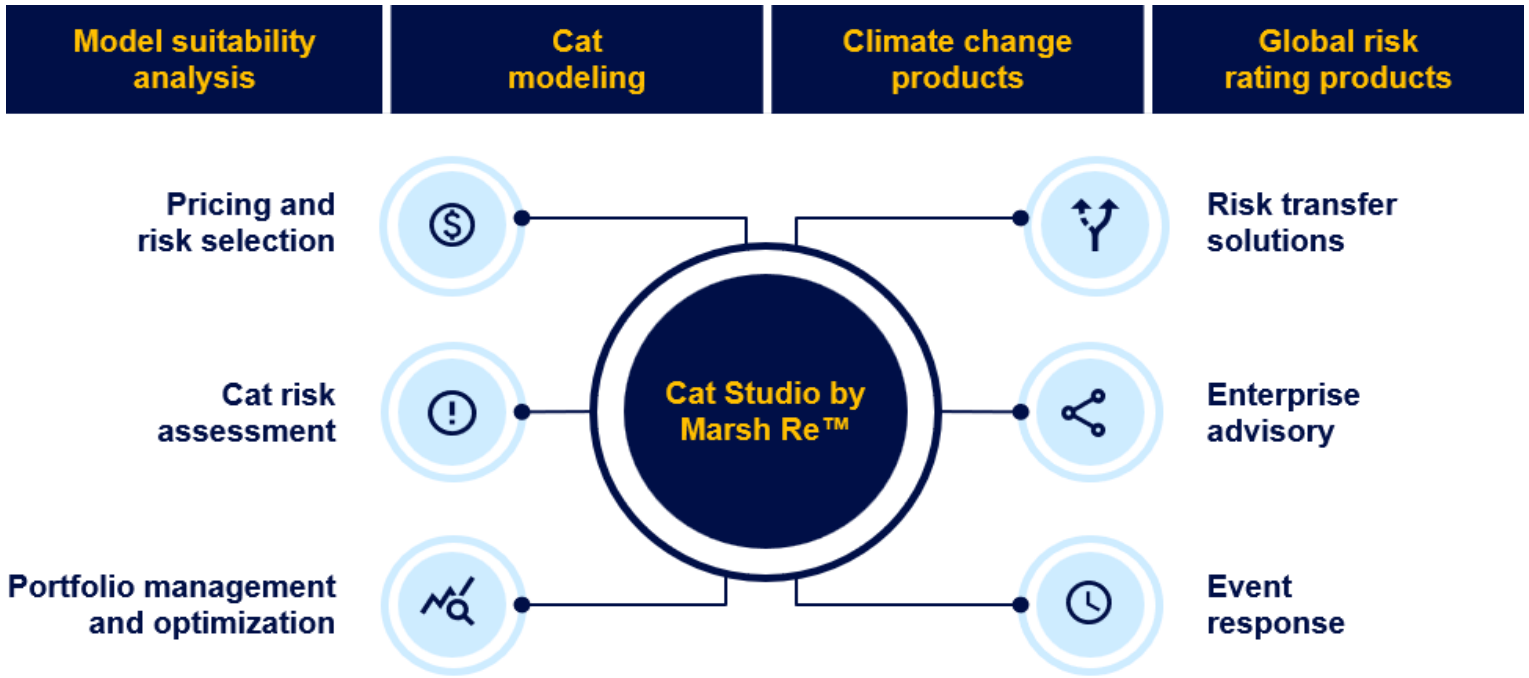


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