
CAT Resource Center Post-Event Report

# EASTERN AND SOUTHERN SPAIN: OCTOBER 2024 DANA FLOODS

*By Samuel Bray, Ana Nieto and Edward Wilson – Guy Carpenter – November 2024*

## Overview

- Valencia, Spain experienced historical levels of flooding on October 29 and 30, causing widespread property damage and loss of life. The (re)insurance market is now calculating the financial impacts and evaluating the unique characteristics of the event to improve our understanding and preparedness for future events.

- This was caused by a DANA (a Spanish acronym representing a high-altitude, cut-off low-pressure storm system), where a cold air mass broke from the jet stream, colliding with warm Mediterranean air and forming a slow-moving storm with heavy rainfall. The heavy rains began as soon as October 26.

- On October 28, golf-ball-size hailstones pelted the city of Almeria, accompanied by severe rain that left the city flooded.

- On October 29, an area between the municipalities of Utiel and Chiva received more than 300 millimetres of rainfall during a 4-hour period, with some areas of Valencia receiving more than an entire year's worth of rainfall during an 8-hour period.

- The region's geography—steep streams, rocky soil and urban surfaces—exacerbated the flooding as rainwater rapidly turned into destructive runoff.

- Climate change is increasing the severity of such flooding events due to warmer temperatures that allow the atmosphere to hold more moisture. However, there is still uncertainty on whether climate change is affecting the frequency of cut-off lows like DANA.

- As of 8 a.m. November 8, Consorcio de Compensación de Seguros (CCS) reported receiving more than 138,000 claims, with more than 43,000 for residential dwellings and more than 83,000 for motor vehicles. This number of claims, even preliminary, was exceeded only once in CCS history (windstorm Klaus in January 2009).

- CCS estimates it will cover 90–95% of the claims in the region for EUR 3.5 billion, with the remaining EUR 250-300 million incurred by primary insurers. The balance sheet equalisation reserve available to cover insured risks at the close of 2023 reached EUR 10.3 billion.

## This briefing covers the following topics:


- Meteorological Discussion
- Weather Impacts
- Insurance Impacts and Effects of Consorcio
- Impact on the Market and Loss Estimate


## Meteorological Discussion

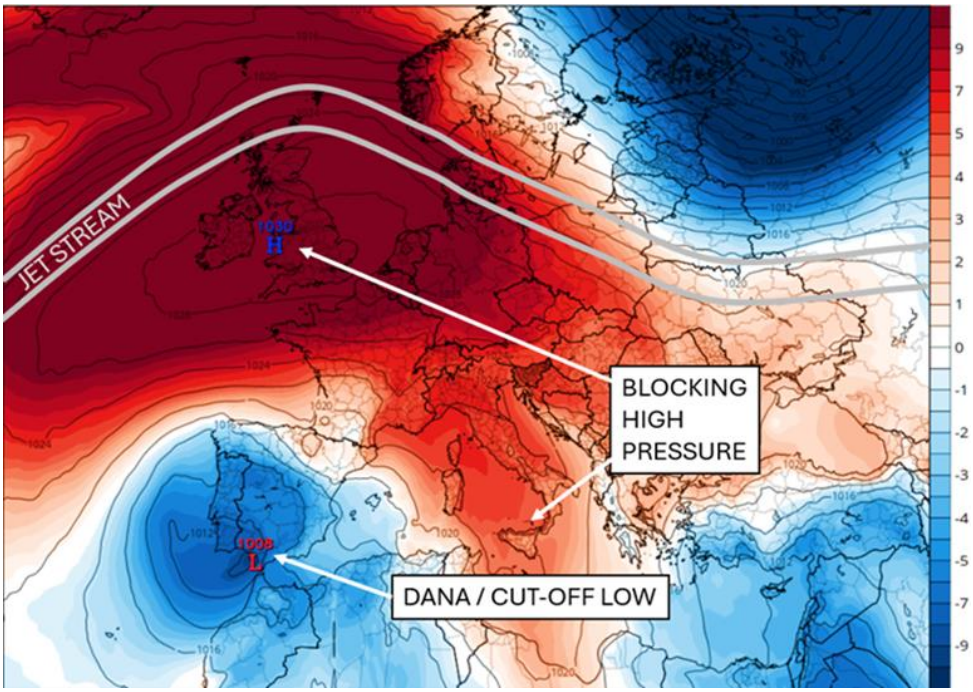
The recent flash flooding in Valencia was triggered by an intense weather event known as DANA (Depresión Aislada en Niveles Altos) or Cold Drop (Gota Fría), a Spanish term for a high-altitude cut-off low-pressure system. This phenomenon occurs when a pocket of cold air breaks away from the jet stream, where it collides with the warm, moisture-laden air of the Mediterranean. The resulting sharp temperature gradient forces the warm air to rise rapidly, forming clouds heavy with precipitation.

Southeast Spain is particularly susceptible to DANA events due to its position between warm Mediterranean and cooler Atlantic waters, with warm and cold air masses often meeting in mountainous regions that enhance storm formation. Valencia has experienced other major DANA events in the past (including in 1957 and in the 1980s). This 2024 event was made particularly severe partly due to climate change intensifying rainfall.

The DANA event led to prolonged and intense downpours, releasing over 300 millimetres of rain within just a few hours between Utiel and Chiva in Valencia. Some areas of Valencia received more than an entire year's worth of rainfall in an 8-hour period. Comparing Chiva's rainfall with the intensity-duration-frequency (IDF) curves from Moncho et al. (2009),[1] the return period for the 4-hour accumulations corresponds to a return period surpassing 1,000 years.

[1] Moncho, Roberto, Fernando Belda Esplugues, and Vicente Caselles. "Estudio climático del exponente "n" de las curvas IDF: aplicación para la Península Ibérica." (2009), Tethys: Journal of Mediterranean Meteorology and Climatology. 2009, 6, p. 3-14, http://hdl.handle.net/20.500.11765/12353

**Figure 1: GFS MSLP and Anomaly (hPa) based on CFSR1981-2010 Climatology, Valid 12z Wednesday, October 30, 2024.**




*Source: Cowan, L. (2024). Forecast Models. [online] Tropical Tidbits. Available on https://www.tropicaltidbits.com*

**Figure 2: Satellite imagery showing before and after of flood event.**


*Source: NASA*

This region of Spain is prone to flash flooding due to its small, steep streams, which quickly channel rain into runoff. The dry soil in the region can limit infiltration, so intense rain flows overland rapidly, eroding topsoil. In urban areas, floods worsen as debris blocks drainage systems and paved surfaces funnel water faster through streets. Together, these factors lead to a sudden buildup of floodwater that can be highly destructive, especially when multiple streams converge at once.

Extreme weather events causing flooding have become more severe due to climate change. A warmer atmosphere holds more moisture, which increases the potential for extreme rainfall.

- This type of event generally occurs during autumn, when residual summer warmth at the surface clashes with colder air aloft in cut-off lows.
- Warmer land and sea temperatures, along with increased moisture availability, intensify these systems–a trend that is expected to continue as surface temperatures rise.
- Currently, there is limited confidence in any trend regarding frequency of cut-off low events resulting from climate change.
- The World Weather Attribution[2] stated 1-day rainfall events with the intensity of this event are approximately 12% more intense and about twice as likely to occur in today's climate.

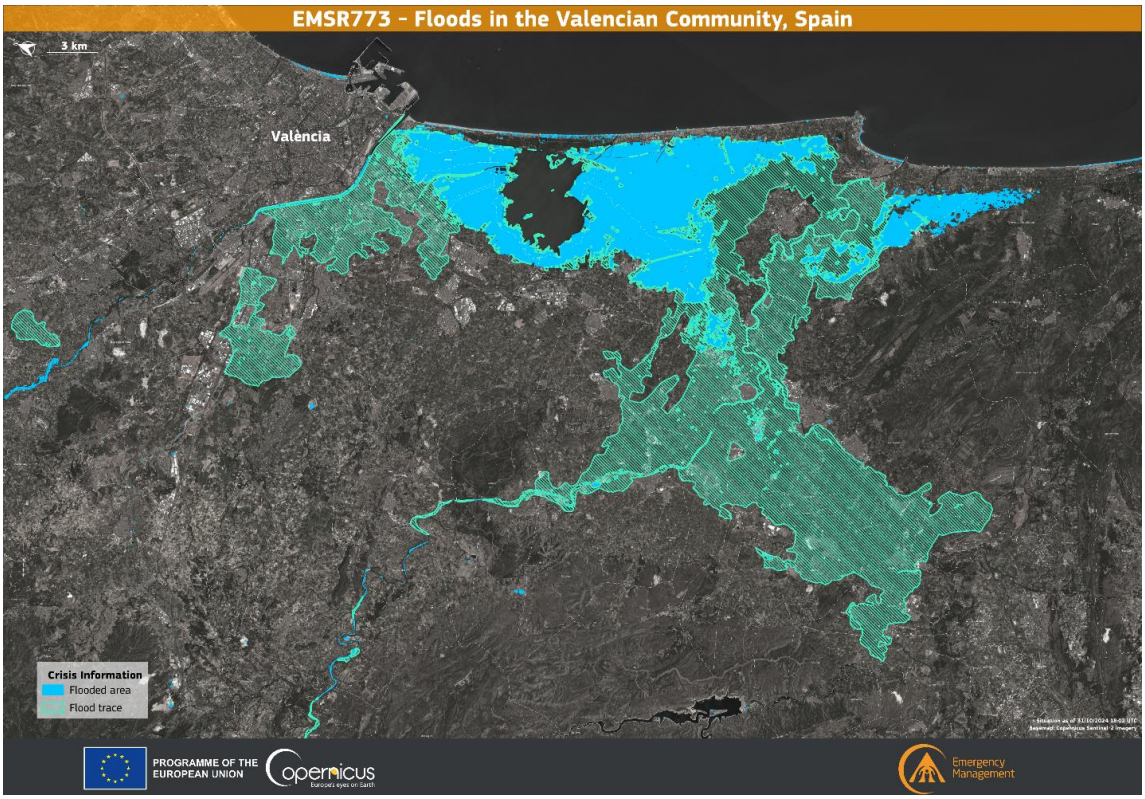
## Weather Impacts

The widespread flash flooding across the region tragically resulted in significant loss of life: with 217 fatalities recorded as of November 7, and 93 persons still missing.[3]

Satellite imagery from Copernicus, and particularly the Sentinel constellations, demonstrates the widespread extent of the flooding, as shown in Figure 3.

[2] Extreme downpours increasing in Southern Spain as fossil fuel emissions heat the climate – World Weather Attribution
[3] https://www.lamoncloa.gob.es/info-dana/Paginas/2024/051124-datos-seguimiento-actuaciones-gobierno.aspx

**Figure 3:** Floods in Valencian community.




*Source: European Union, Copernicus Sentinel-1 imagery*

The image from Copernicus depicts the situation as of October 31, highlighting areas directly affected by floods in blue and areas with residual traces of flooding in lighter green. The map shows more than 53,000 hectares affected.[4]

The rainfall concentrated over the Magro, Turia and Poyo river basins. This produced rapidly rising water levels that overtopped banks and flooded surrounding roads, railways, buildings and other infrastructure.

A destructive feature of the event was the sediment-laden floodwaters that have coated the affected areas with mud, shown below in before and after satellite images of Paiporta (see Figure 4).

[4] https://www.copernicus.eu/en/media/image-day-gallery/copernicus-emergency-management-service-monitors-floods-valencia-spain

**Figure 4:** **Satellite views before and after the floods in Paiporta, Valencia. First image from October 18. Second image from October 31.**


*Source: Photo: Maxar Technologies5, Creative Commons License https://creativecommons.org/licenses/by/4.0/deed.en*

The Spanish government has deployed approximately 5,000 troops and 5,000 police officers and civil guards to assist with the flood response, including search-and-rescue operations and efforts to pump water out of underground tunnels and car parks.

[5] Maxar Intelligence & Maxar Space Systems

## Insurance Impacts and Effect of Consorcio

The Consorcio de Compensación de Seguros (CCS), a unique Spanish entity for extraordinary risk coverage, is central to the insurance response. CCS provides automatic coverage for catastrophic events such as floods, earthquakes and other extreme weather events, without the need for an official disaster declaration. This system allows policyholders to receive compensation even if only a single policyholder is affected, focusing on the qualitative nature of the event rather than requiring a quantitative threshold of losses.[6]

Transport insurance, construction, erection policies and agricultural productions are out of the scope of CCS, with the latter potentially insured using Combined Agricultural Insurance. On the other hand, life insurance and loss of profits policies are covered by CCS.

As of November 8, CCS reported more than 138,000 claims from this flood event, spanning multiple lines of business.[7] CCS's claims process is enabled by the extraordinary risk surcharge included in standard insurance premiums, which automatically extends coverage for these risks to all valid policyholders. Requirements include maintaining current premium payments and a latency period of 7 days from policy issue, with no such period for personal injury claims.

Considering the high concentration of older vehicles in the affected areas, CCS, in collaboration with UNESPA (Spanish Association of Insurers) has agreed to increase vehicle claim payments by 20% to account for the higher average age of vehicles in the region. This adjustment reflects the impact of the floods on the 28% of vehicles registered in the hardest-hit municipalities, such as Torrent and Alzira. A significant percentage (61%) of these vehicles are more than 10 years old, impacting repair costs and the overall compensation required.[8]

In addition to the aforementioned arrangement, the enforced franchise of 7% on the claim amount applied to property damage policies except motor, dwellings and condominiums will be withdrawn for those businesses with turnover below EUR 6 million.

While CCS covers a wide array of extraordinary risks, certain exclusions are specified. For example, damage from direct rainfall on the property, hailstorms, non-catastrophic wind events (with gusts below 120 km/h) and occurrences like seepage or lack of maintenance fall outside CCS's scope unless directly linked to an extraordinary event, such as flooding caused by unusual cyclonic storms.[9]

[6] CCS (Consorcio de Compensación de Seguros): Available at Consorcio de Compensación de Seguros website.
[7] CCS (Consorcio de Compensación de Seguros): *Bulletin on the Valencia Floods, November 8*
[8] Solera (via SegurosNews): *Vehicle Statistics in Valencia Flood-Affected Areas*
[9] CCS (Consorcio de Compensación de Seguros): *Extraordinary Risks Coverage and Exclusions*

## Impact on the Market and Loss Estimate

According to Consorcio's scope and exclusions, the following considerations are rendered:

- **Insurance claims:** While Consorcio will likely absorb the majority of the extraordinary risk claims related to flood, agricultural losses will be covered by Agroseguro and primary insurance companies will handle extraordinary risks not covered by CCS such as hail and wind below regulated wind speed threshold claims as well as Construction and Erection Risk (CAR/EAR) policies or water leakage derived claims, for instance.
- **Losses and financial impact:** Expected to be limited due coverage from Consorcio. However, damages to infrastructures–potentially uninsured or minimally covered, such as communication routes–are estimated to amount to EUR 2.6 billion. A total of agricultural and livestock within 20,000 hectares are estimated to be affected by this event, comprising EUR 160 million in insured values.

To evaluate the exposure at risk, Guy Carpenter has provided a map for potential flood-affected areas across the region, which is integrated into GC AdvantagePoint®, Guy Carpenter's market-leading proprietary tool. This was overlaid with industry exposure to estimate the likely number of properties affected and build up a loss estimate. The map is shown in Figure 5.

**Figure 5:** **MIS/GC Flood extent map, basemap: Map data**


*Source: Copyright Google 2024*

Our initial analysis produces a smaller number of affected properties due to the coverage of the satellite-derived footprint. The CCS information is based on recorded claims, and their current expectation is that the total cost to CCS will be around EUR 3.5 billion, with CCS likely covering 90-95% of the damages, resulting in approximately EUR 250-300 million paid by the private insurance sectors. The balance sheet equalisation reserve available for CCS to cover insured risks at the close of 2023 arrived at EUR 10.3 billion. This event will be by far the costliest one CCS has experienced, largely eroding CCS reserves.

**Table 1: Costliest DANAs in Spain within the last 10 years.**

| Occurrence Date | Location | Number of Claims | Claim Amount (as of 2023) |
|---|---|---|---|
| September 2019 | Southeastern Spain | 55,785 | EUR 478.9 million |
| December 2021 | Widespread | 7,858 | EUR 103.6 million |
| September 2023 | Toledo and Madrid | 20,055 | EUR 172.4 million |

*Source: Consorcio de Compensación de Seguros*

On the proportion of claims assumed by the private insurance companies, the most damaging DANA in the last 20 years was estimated to be covered by CCS for approximately 85% of the total cost, slightly below the proportion to be assumed by CCS in this event.

# Contact

To learn more about this event, please reach out to any of the following specialists:

**Samuel Bray**
Vice President, International Peril Advisory
+ 44 (7385) 976500
samuel.bray@guycarp.com

**Luis Coelho**
Head of Catastrophe Modelling, Iberia
+ 34 667 838 756
luis.coelho@guycarp.com

**Marisol Bernal**
Managing Director, Iberia
+ 34 670 782 459
marisol.bernal@guycarp.com

**Ana Nieto**
Head of Analytics, Iberia
+ 34 91 210 06 66
ana.nieto@guycarp.com

**Artur Reñe**
CEO, Iberia
+ 34 91 210 06 68
artur.rene@guycarp.com

**François Dagneau**
Head of Analytics, Continental Europe
+ 41 (79) 5273 657
francois.dagneau@guycarp.com

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