NOV 2024

Geography
in the news.

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Storm Boris leaves trail of destruction in Central Europe

In early September 2024, devastating floods swept across parts of Central Europe affecting Austria, Czechia (Czech Republic), Hungary, Poland, Romania and Slovakia.

The floods were caused by several days of torrential rain associated with Storm Boris, named by Italy's Servizio Meteorologico. In some places, up to five times the average September rainfall fell in just four days. At least 25 people were killed by the floods in Central Europe.

What were the impacts of Storm Boris?

Dozens of towns were flooded as dams and embankments failed and rivers burst their banks. In places, retention basins designed to store water and prevent flooding, were completely overwhelmed.

- In Czechia, 15,000 people were evacuated from the north-eastern Moravia-Silesia region and helicopters were deployed to deliver aid to areas cut off by the floods. The town of Bohumin was inundated.
- In Poland, many of the 44,000 residents of Nysa were evacuated to higher ground because an embankment holding back water in a lake was at risk of being breached. Many towns were inundated with torrents of water destroying homes and bridges.
- In Austria, four consecutive days of rain caused severe flooding in the village of St Pölten, 30 miles from Vienna. Fortunately, the retention basins designed to protect the Austrian capital were largely successful in preventing widescale flooding.

Figure 1: Flooding in Czech Republic

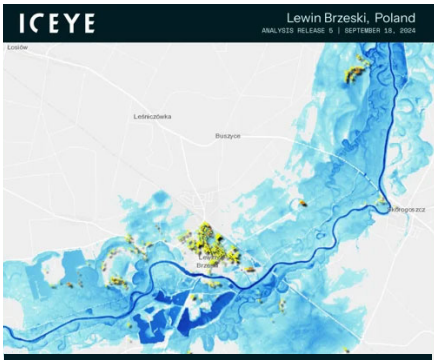
How was satellite imagery used to track the flooding?

US-based satellite company ICEYE used satellite images to track the floods in Central Europe. The image in Figure 2 shows the extent of the river flooding near the Polish town of Lewin Brzeski. Despite the recent construction of a flood control channel on the Nysa Kłodzka river, 90% of Lewin Brzeski was flooded.

ICEYE used images like the one in Figure 2 to assess the impacts of the floods. They concluded that some 20,000 buildings were affected by the floods in Southern Poland and a further 5,000 buildings in Austria.

[Notice the old meandering channels and ox bow lakes on Figure 2 opposite]

[Colours indicate buildings affected by floodwater depth categories: red (high), orange (medium), Yellow (low)]



Flooding of Nysa Kłodzka river near Lewin Brzeski, Poland

Figure 2

Is Storm Boris an indication of climate change?

Whilst no single storm event can be attributed to climate change, scientists suggest that extreme weather events such as Storm Boris may become more frequent in the future. In a warmer world, the atmosphere can hold more moisture and this could result in more intense and more frequent storms.

The EU's crisis management commissioner warned, 'This is fast becoming a norm for our shared future. Europe is the fastest warming continent globally and is particularly vulnerable to extreme weather events.'

In the meantime, countries will review their approaches to flood management to enable them to be better prepared for similar events in the future. In Austria, the use of retention basins prevented major flooding in Vienna by temporarily storing water. Similar nature-based solutions, allowing controlled flooding in places and reducing the speed of water transfer towards populated areas need to be considered alongside more conventional dams and embankments.

Record rainfall triggers September floods in England

In September 2024, heavy and persistent rain led to widespread flooding across parts of England.

The South Midlands was particularly badly affected as several places recorded a month's worth of rainfall in a single day. Woburn in Bedfordshire received 116mm of rain, which inundated homes and caused widespread transport disruption. According to the Environment Agency, the floods affected approximately 850 properties.

In London, flooding caused some services on London Overground and the underground to be suspended. Flooding at Wimbledon FC's football ground exposed a large sinkhole in the pitch!

According to a Met Office report, England saw 95% more rainfall than its September average with ten counties experiencing their wettest September on record. Figure 3 shows September's rainfall compared to the 30-year average. Notice the extreme rainfall concentrated in the South Midlands.

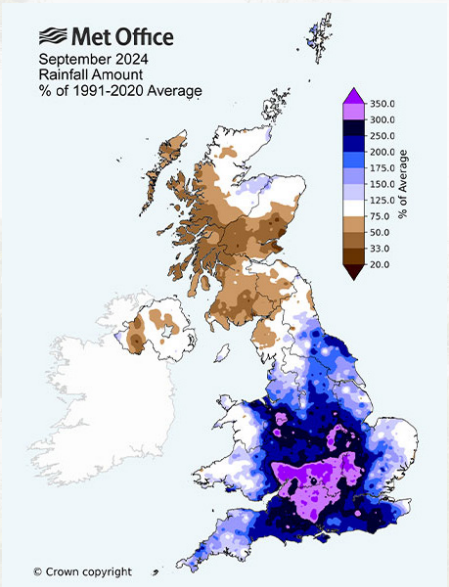


Figure 3

End of an era at Port Talbot steelworks

On 30 September 2024, the Tata steelworks in Port Talbot, South Wales 'tapped' (shut down) the last blast furnace (Blast Furnace 4) that had been used to make traditional steel since the 1950s. There are just two steelworks in the UK, the other being at Scunthorpe, Lincolnshire. The last two blast furnaces in operation are at Scunthorpe and these are also threatened with closure.

What does a blast furnace do?

A blast furnace is a large industrial furnace that is used to heat and extract liquid iron from iron ore.

- Iron ore, coking coal and limestone are fed into the top of the furnace to form alternate layers
- Hot air is blown into the base of the furnace and the coking coal combusts. Temperatures can reach up to 2,000C!
- Carbon monoxide gas produced by the combustion reacts with the iron ore to remove oxygen
- The molten iron collects at the bottom of the furnace from where it can be tapped for processing into steel.

Steel is much more malleable than iron. It can be rolled or used to produce sheets making it an ideal raw material for manufacturing.

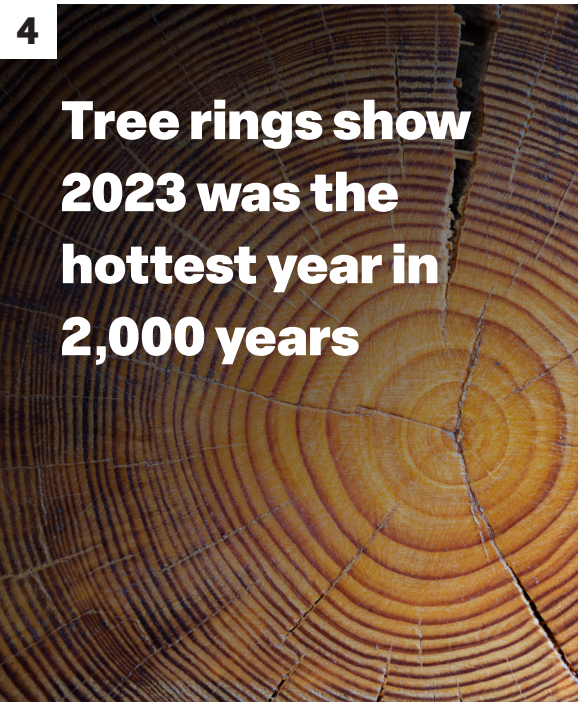
What is the difference between primary and secondary steelmaking?

Primary steelmaking uses blast furnaces to extract iron from its original source, iron ore. This traditional process can supply a variety of industries with different types of steel.

Secondary steelmaking involves melting down scrap using an electric arc furnace where it is mixed with carbon to produce steel. It tends to be cheaper than primary steelmaking and reduces waste by recycling scrap. Whilst secondary steel also has a wide variety of uses, it is usually not as strong as primary steel. It is also reliant upon the supply of scrap.

What is the future for Port Talbot?

Tata Steel UK plans to invest £1.25bn to install an electric arc furnace which will produce steel from scrap. This will reduce carbon emissions and secure the future of steelmaking in Port Talbot. The UK government has committed to spend £500m towards the cost of construction (Tata will therefore pay £750m of the total cost), which is due to start in August 2025. Steelmaking is expected to resume in 2027. The restructuring will, however, result in the loss of over 2,500 jobs.



Tree rings show 2023 was the hottest year in 2,000 years

Researchers at Cambridge University have reported that 2023 was not only the hottest year since records began (late 19th century) but the hottest year for at least 2,000 years!

Weather records using instruments extend back to the 19th Century but these are patchy and unreliable. Scientists mostly use records from 1914 when observation stations became more standardised enabling comparisons to be made accurately.

The scientists at Cambridge University have studied tree rings, which provide an annual temperature record extending back over 2,000 years. Researchers have concluded that summer temperatures in 2023 were 2.07 degrees Celsius hotter than 1850-1900. This suggests that the aims of the Paris Agreement (2015) to limit warming to 1.5 degrees Celsius above pre-industrial levels has already been broken.

Tree rings provide 'proxy' evidence of climate change. This means that, whilst they don't measure temperature directly, their rings show the effects of temperature. Trees create a new ring each year and the rings vary in thickness. The higher the temperature, the more the growth and the wider the ring. Each ring has a light part (spring and summer) and a dark part (autumn and winter). This enables scientists to consider seasonal variations as well as yearly trends.

The exceptionally hot year in 2023 has been explained by a combination of increased greenhouse gases and a strong El Niño climate event, which affected the world's climate patterns.