

Environmental Hazards Newsletter

4th Apr 2018

Hurricanes and Cyclones

NETL study: the importance of coal for power during “Bomb Cyclones”

A new analysis conducted by the U.S. Department of Energy’s National Energy Technology Laboratory (NETL) indicates that continued retirement of fossil fuel power plants could have an adverse impact on the nation’s ability to meet power generation needs during future severe weather events. A winter storm, known as a “bomb cyclone,” struck much of the eastern United States between December 27, 2017, and January 8, 2018, plunging the region into a deep freeze and sparking a significant rise in the demand for additional power for heat. Coal provided a majority of the daily power generation required to meet the emergency, according to the study. The report analyzes fossil fleet performance and its contribution to power system reliability and resilience during the bomb cyclone event.

http://www.wyomingbusinessreport.com/newsletter_pm/netl-study-the-importance-of-coal-for-power-during-bomb/article_0f14c306-3201-11e8-b6fc-db6b10735592.html

Additional sources: (Newswise)

A Comparison Of How The Government Responded To Hurricanes Harvey And Maria

Politico reporter Danny Vinik found some striking differences in the way the federal government responded to Hurricanes Harvey and Maria. NPR's Ailsa Chang speaks with Vinik about the findings.

<http://www.npr.org/2018/03/29/598053556/a-comparison-of-how-the-government-responded-to-hurricanes-harvey-and-maria>

This Is How Science Will Save Us From Hurricanes

As the ocean waters continue to warm, the frequency of the most powerful classes making landfall has increased, forcing us to contend with our vulnerability to their destructive effects. But we thoroughly understand how hurricanes form and sustain their power, and if we can understand it, we can combat it using science. Researchers now think they've found a practical, cost-effective way to do exactly that.

<http://www.forbes.com/sites/startswithabang/2018/03/28/this-is-how-science-will-save-us-from-hurricanes/>

Heatwaves, hurricanes, floods: 2017 costliest year ever for extreme weather and climate events, says UN

State of the Global Climate in 2017 Source: WMO Hurricanes, monsoon floods and continuing severe drought made 2017 the costliest year ever for severe weather and climate events, according to a new report by the United Nations weather agency

<http://en.mercopress.com/2018/03/23/heatwaves-hurricanes-floods-2017-costliest-year-ever-for-extreme-weather-and-climate-events-says-un>

Tropical Cyclone Nora on track to hit Queensland coast as category three storm

Cyclones on the Gulf are highly unpredictable, and forecasters said there was still uncertainty over Nora’s path. The latest tracking map suggested it would be a category three storm on Saturday night, when it would be off Aurukun on the Cape York Peninsula’s western coast. It was expected to remain a category three on Sunday when it would be even closer to the coast, but further south between Kowanyama and the Gilbert river mouth. The emergency services minister, Craig Crawford, said residents on the Gulf Coast from Thursday Island to the NT border should prepare for strong winds and heavy rainfall.

<http://www.theguardian.com/australia-news/2018/mar/23/cyclone-nora-gulf-of-carpentaria-queensland-northern-territory>

US hurricanes contribute to £2bn annual loss for Lloyd's of London

Pre-tax losses for Lloyd's of London reached £2bn last year, the first time the insurer has incurred an annual loss in six years. According to BBC News, this was a sharp reversal after the insurance market made £2.1bn in profit during 2016. Lloyd's of London cited a spate of bad weather as a key factor in the losses, including hurricanes in the US such as Harvey, Irma and Maria, wildfires in California, a Mexican earthquake and flooding in Bangladesh. The market paid a total of £18.3bn in claims, of which £4.5bn was directly attributable to the disasters. Lloyd's of London's chief executive Inga Beale said: "The market experienced an exceptionally difficult year in 2017, driven by challenging market conditions and a significant impact from natural catastrophes."

<http://www.financial-news.co.uk/46977/2018/03/us-hurricanes-contribute-to-2bn-annual-loss-for-lloyds-of-london/>

Additional sources: ([HITC](#))

Are Nor'easters and Bomb Cyclones the New Normal?

In the past three weeks three harsh nor'easter storms have battered the northeastern U.S., bringing the total to five for the winter. A sixth may be forming this week, which is highly unusual. Four of the five storms were bomb cyclones, a legitimate technical term that means the atmospheric pressure within the nascent storms dropped rapidly and radically, causing them to "blow up" into raging beasts. Scientists have been predicting these very circumstances. And now they have new data showing that the rapidly warming Arctic is at least partly to blame.

<http://blogs.scientificamerican.com/observations/are-noreasters-and-bomb-cyclones-the-new-normal/>

Bomb Cyclones, Nor'easters, and the Messy Relationship Between Weather and Climate

Led by Judah Cohen, a visiting scientist at M.I.T. and the director of seasonal forecasting for the climate-risk company Atmospheric and Environmental Research, the group looked back at meteorological records from twelve American cities, spanning from 1950 to 2016, and found that, when temperatures were anomalously high in the Arctic, extreme winter weather on the East Coast was between two and four times likelier to occur. The paper, Cohen said, does not attempt to explain why this might be. "Here we are just trying to establish that a warm Arctic really leads to a cold, more extreme winter,"

<http://www.newyorker.com/tech/elements/bomb-cyclones-noreasters-and-the-messy-relationship-between-weather-and-climate>

World weatherwatch: Nor'easter whips against US as cyclones slam South Pacific

Cyclone Hola continued its path south-eastwards across the South Pacific this week, brushing along the northern-most fringes of New Zealand's North Island. The cyclone, which intensified to category 4, brought with it heavy rain and strong winds in excess of 70mph to communities along the Bay of Plenty and Gisborne as well as to the country's capital, Auckland. It was the third big storm to strike the country this year.

<http://www.theguardian.com/news/2018/mar/14/world-weatherwatch-noreaster-whips-against-us-as-cyclones-slam-south-pacific>

Planet-sized cyclones just one highlight of Juno's new views of Jupiter

Some of the most beautiful images from the mission are of the enormous cyclones that encircle the poles. These storms resemble geometric arrangements of fiery roses, and according to Dr. Scott Bolton, the Principal Investigator for the Juno mission, and Associate Vice president of the Southwest Research for Science and Engineering, they were a significant surprise. Juno is the first spacecraft to fly over Jupiter's poles, so these storms were a new discovery. The north pole has eight cyclones circling a central storm, while the south pole contains five cyclones around a central storm. Researchers are now trying to better understand what drives these enormous storms, how long they

might last, why they cluster as they do, and how deeply into the atmosphere they reach.

<http://www.cbc.ca/radio/quirks/march-10-2018-jupiter-s-stormy-secrets-video-games-and-violence-gates-of-hell-and-more-1.4567954/planet-sized-cyclones-just-one-highlight-of-juno-s-new-views-of-jupiter-1.4567957>

Additional sources: ([Time](#)) ([National Geographic](#))

Extreme Temperatures

Extreme rainfall events in India are linked to man-made emissions, finds study

Here is more evidence on why we need to worry about climate change. A new study says extreme rainfall events are on the rise in India and it attributes the trend to man-made emissions – or what scientists call “anthropogenic warming”. Not just this ...

<https://scroll.in/latest/873633/extreme-rainfall-events-in-india-are-linked-to-man-made-emissions-finds-study>

Additional sources: ([The Wire](#)) ([India.com](#))

Extreme weather is here to stay as whole world faces upsurge in major storms

A world addled by climate change has seen a four-fold increase in major flooding events since 1980, and a doubling of significant storms, droughts and heat waves, Europe’s national science academies jointly reported this week. In Europe, where precise data reaches back decades, the number of severe floods has jumped five fold since 1995, according to the report, which updates a 2013 assessment.

<http://www.thejournal.ie/weather-storms-here-3916958-Mar2018/>

Additional sources: ([Continuity Central.com](#)) ([The Hindu](#)) ([Daily Mail](#)) ([The London Economic](#))

Marine heatwave recorded in Tasman Sea breaks records, prompts joint climate report

The Tasman Sea experienced a "marine heatwave" over summer that pushed the surface temperature to a record high, climate scientists say. Following a particularly hot summer on both sides of the Tasman and in between, the Bureau of Meteorology and New Zealand's National Institute of Water and Atmospheric Research teamed up to release a "special climate statement". New Zealand's summer was the hottest ever recorded, while Tasmania had its hottest November-January on record. "Tasmania had its warmest November on record and its second-warmest December and second-warmest January," senior BOM climatologist Dr Blair Trewin said.

<http://www.abc.net.au/news/2018-03-27/bom-and-nz-body-issue-joint-statement-on-marine-heatwave/9593618>

Wind gust in Friday's storm strongest in eight years

The strongest wind gust in eight years was recorded during Friday's thunderstorm which battered several farms in Lim Chu Kang. Wind speed hit a high of 133.3kmh at nearby Tengah at 3.50pm, said the Meteorological Service Singapore (MSS) yesterday. "This is the strongest wind gust recorded on our islandwide network of wind sensors since 2010," it added. The highest-recorded wind gust is 144.4kmh, also in Tengah, on April 25, 1984.

<http://www.straitstimes.com/singapore/wind-gust-in-fridays-storm-strongest-in-eight-years>

‘Extreme’ heatwave recorded in Tasman Sea breaks records

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<https://thenewdaily.com.au/weather/2018/03/27/extreme-heatwave-recorded-tasman-sea-breaks-records/>

Powerful images of extreme storms dominate campaign for World Climate Day

Storms have gotten stronger and more vicious, and their effects are highlighted in a new Colombian

campaign for World Climate Day. In honor of the day, Conservative International has launched a new spot designed to highlight climate change and the fact that hurricanes, earthquakes and tsunamis happen more and more often in different countries all over the world, to often devastating effects.

<http://www.thedrum.com/news/2018/03/26/powerful-images-extreme-storms-dominate-campaign-world-climate-day>

Maximum temperatures in Singapore's cool months rising faster than warmer months:

December and January, traditionally the cooler months in Singapore, experienced the highest rate of increase in extreme warm temperatures between 1984 and 2017, according to the Meteorological Service Singapore (MSS). In its 2017 Annual Climate Assessment Report released on Friday (Mar 23), MSS said during the two months of December and January, there has been the strongest rate of increase in warm days and decrease in the number of cool days. Between 1984 and 2017, the mean daily maximum temperatures for December and January increased by 0.19 degrees Celsius per decade, while the highest daily maximum temperatures increased by 0.31 degrees Celsius per decade.

<http://www.channelnewsasia.com/news/singapore/maximum-temperatures-in-singapore-s-cool-months-rising-faster-10069584>

Europe Saw a Spike in Extreme Weather Over Past 5 Years, Science Academies Say

Europeans are facing more frequent extreme weather as the planet warms. Floods and big landslides have quadrupled and extreme heat waves and crop-damaging droughts have doubled since 1980, with a sharp spike in the last five years, according to the European Academies' Science Advisory Council's latest extreme weather update. The increase in the frequency of extreme weather events should spur European countries to boost adaptation and resiliency efforts, said EASAC Environment Program Director Michael Norton.

<https://insideclimatenews.org/news/21032018/europe-climate-change-extreme-weather-data-floods-heatwave-drought-oceans-easac-report>

Expert reaction to new report on extreme weather and climate change

Dr Phil Williamson, climate researcher at the University of East Anglia (UEA), said: "The linkage between climate change and individual weather events – such as the Beast from the East – is inherently uncertain. Nevertheless, the EASAC report does provide convincing evidence for an increasing frequency of extreme weather in Europe, with major economic consequences. "These results are fully consistent with the global trends, from this new report and other analyses, on the consequences of increased heat energy in the Earth system. For example, there have been roughly ten times more warm record-breaking temperatures than cold ones in the past 150 years. "On a day-to-day basis, we can't choose what weather we get. But there is a societal choice on what the climate will be in future, with its associated weather extremes, depending on how rapidly national commitments relating to the Paris Agreement are implemented".

http://www.sciencemediacentre.org/_trashed/

Human influence on climate change will fuel more extreme heat waves in US

Human-caused climate change will drive more extreme summer heat waves in the western US, including in California and the Southwest as early as 2020, new research shows.

<https://www.sciencedaily.com/releases/2018/03/180319124302.htm>

Extreme winter weather becoming more common as Arctic warms, study finds

A sharp increase in temperatures across the Arctic since the early 1990s has coincided with an uptick in abnormally cold snaps in winter, particularly in the eastern US, according to new research that analyzed temperature data from 1950 onwards. Extreme cold winter weather is up to four times more likely when temperatures in the Arctic are unusually high, the study found. Researchers compared daily temperatures from across the Arctic region with something called the accumulated winter season severity index, which grades winter weather based on temperature, snow fall and

snow depth, across 12 US cities.

<http://www.theguardian.com/environment/2018/mar/13/extreme-winter-weather-becoming-more-common-as-arctic-w-arms-study-finds>

Weather warning: EXTREME weather 'cost world economy £230 BILLION'

The alarming revelations were published by the World Meteorological Organisation (WMO) in its Statement on The State of the Global Climate, timed to coincide with World Meteorological Day. Scientists have warned that about 30 per cent of the world's ...

<https://www.express.co.uk/news/weather/938967/weather-warning-extreme-weather-cost-world-economy-billions>

Earthquakes

5.3-magnitude earthquake in Iran's Kurdish region leaves at least 38 casualties

An earthquake in Iranian Kurdistan's (Rojhilat) Kermanshan Province on Sunday left at least 38 people injured, local media reported. The 5.3-magnitude earthquake rocked the western Iranian region at 1:05 p.m. (local time), a report from the seismography center affiliated with Tehran University Geophysics Institute revealed. The tremor's epicenter was located at a depth of eight kilometers underground near the town of Sarpol-e Zahab in Kermanshan

<http://www.kurdistan24.net/en/news/90f547c8-ec34-45d9-a3d7-930eae3613e2>

Additional sources: ([China Internet Information Center](#))

Papua New Guinea earthquake: Strong tremor off New Britain island

A strong magnitude 6.9 earthquake has struck off the coast of Papua New Guinea's New Britain island, the US Geological Survey (USGS) says. Hazardous tsunami waves were forecast for some coastlines but there were no immediate reports of damage. The quake struck some 162km (100 miles) from Rabaul, on New Britain island, at 07:25 on Friday (21:25 GMT Thursday). The USGS originally estimated a shallow depth of 10km but later revised it to 35km.

<http://www.bbc.co.uk/news/world-asia-43592321>

Additional sources: ([ABC Online](#)) ([The Guardian](#)) ([The Guardian](#))

Three earthquakes strike south of San Jose

Three small earthquakes struck south of San Jose early Saturday morning, the United States Geological Survey reports. The first, a magnitude 2.7, was centered 6 miles east of Gilroy. It hit at 2:05 a.m. The second arrived at 7:33 a.m. and registered 3.0 on the Richter scale. It was located 3 miles from San Juan Bautista. The third, measured at 2.8, happened at 8:07 in the morning and was in nearly the same location, 3 miles from Aromas and San Juan Bautista. All of the quakes occurred about 30 miles from downtown San Jose. They were felt across sections of San Benito County and southern Santa Clara County. No injuries were reported.

<http://www.sfgate.com/napa-northern-california-earthquake/article/2-earthquakes-strike-south-of-San-Jose-12795985.php>

Additional sources: ([Express.co.uk](#))

How effective are earthquake early warning systems?

Earthquake early warning detection is more effective for minor quakes than major ones. This is according to a new study from the United States Geological Survey. Seismologists modelled ground shaking along California's San Andreas Fault, where an earthquake of magnitude 6.5 or more is expected within 30 years. They found that warning time could be increased for residents if they were willing to tolerate a number of "false alarms" for smaller events. This would mean issuing alerts early in an earthquake's lifespan, before its full magnitude is determined. Those living far from the epicentre would occasionally receive warnings for ground shaking they could not feel.

<http://www.bbc.co.uk/news/science-environment-43432625>

Something's Going On At Yellowstone: Earthquake Swarm Ongoing For 5 Weeks

The Yellowstone earthquake swarm has been going on for little over five weeks now with no end in sight. As you may know, this is especially terrifying considering the super volcano that calls Yellowstone home. Researchers have recorded well over 1,200 earthquakes at Yellowstone National Park. This phenomenon has been being monitored by several seismologists from the University of Utah since it first began around June 12th. Although this activity is cause for alarm experts do not think these events will cause any sort of eruption from the super volcano.

<https://medium.com/@da.alice/somethings-going-on-at-yellowstone-earthquake-swarm-ongoing-for-5-weeks-91baae439354>

Magnitude 4.3 earthquake rattles central Taiwan

A magnitude 4.3 earthquake jolted central Taiwan's Nantou County at 12:02 a.m. Monday morning (April 2), according to the Central Weather Bureau (CWB). The epicenter of the quake was located 17.5 kilometers east-southeast of Nantou County, at a depth of 23.7 kilometers, according to CWB data. The strongest intensity of level felt from the quake was a level 4 recorded in Chanhua County, while an intensity level of 3 was felt in Nantou County, Yunlin County, Changhua County and Taichung City. An intensity level of 2 was felt in Miaoli County and Tainan City, while an intensity level of 1 was felt in Chiayi County, Hualien County, Taichung County, Kaohsiung City, Yilan County and Penghu County.

<http://www.taiwannews.com.tw/en/news/3395931>

Mexico earthquake devastation spurs California cities to action, despite the costs

A number of cities big and small in Southern California are taking steps to identify seismically vulnerable buildings for the first time in a generation, acting in part on the devastating images of earthquake damage in Mexico and elsewhere around the world. "What happened last year in Mexico City, we don't want to experience in California," David Khorram, Long Beach's superintendent of building and safety, said of the quake that left more than 360 people dead. "We want to be progressive." In hopes of mitigating the loss of life from a major quake that experts say is inevitable, Long Beach is discussing spending up to \$1 million to identify as many as 5,000 potentially vulnerable buildings. The city of Moorpark already has agreed to spend up to \$10,000 for its own survey of at-risk buildings.

<http://www.latimes.com/local/lanow/la-me-ln-socal-cities-earthquake-20180329-htlstory.html>

Volcano popocatepetl on brink of eruption as Mexico fears

Popocatepetl, a "stratovolcano" located near the city, was once again awakened by a small earthquake on Friday evening. During the night vast amounts of thick smoke, along with gas and vapour, were seen pouring out of the mouth of the active volcano. Mexican authorities have set up equipment to keep monitoring the natural phenomenon, but understand its activity can be highly unpredictable. A yellow warning has been issued, urging people "not to approach" the volcano, especially the crater, due to possibility of spewing debris.

<http://www.dailystar.co.uk/news/world-news/692895/volcano-popocatepetl-erupts-earthquake-ring-of-fire-mexico-city>

Light earthquake in Alaska is aftershock from January

A light earthquake was reported Friday afternoon in the Gulf of Alaska. The Alaska Earthquake Center says the magnitude 4.3 quake was centered about 160 miles (255 kilometers) southeast of Kodiak Island. It was located at a depth of about 6 miles (10 kilometers). There are no reports of it being felt or causing damage. The earthquake center said it was an aftershock of the Jan. 23 magnitude 7.9 earthquake that was widely felt throughout south-central Alaska and briefly prompted a tsunami warning. Another light earthquake earlier Friday shook the Cook Inlet region of southern Alaska, not far from Anchorage. The earthquake with a magnitude of 4.1 was centered about 23 miles (37 kilometers) north of Anchorage. The quake had a depth of about 29 miles (47 kilometers).

<http://www.ktuu.com/content/news/Light-earthquake-in-Alaska-is-aftershock-from-January-478461703.html>

5.2-magnitude earthquake hits parts of KP

A 5.2-magnitude earthquake jolted parts of Khyber Pakhtunkhwa province late Friday, according to the seismological centre. The quake, with its epicenter in Afghanistan-Tajikistan border area, had an estimated depth of 230 kilometres, the seismological centre said. Tremors were felt in Peshawar, Mardan, Malakand Division and adjacent areas. There has been no loss of life or property reported in the wake of the earthquake.

<http://www.geo.tv/latest/188808-52-magnitude-earthquake-hits-parts-of-kp>

Light earthquake shakes southern Alaska's Cook Inlet region

Officials say a light earthquake has shaken the Cook Inlet region of southern Alaska, not far from Anchorage. The Alaska Earthquake Center says an earthquake with a preliminary magnitude of 4.1 struck at approximately 3:30 a.m. Friday, and was centered about 23 miles (37 kilometers) north of Anchorage. The quake had a depth of about 29 miles (47 kilometers). There was no immediate word of any damage or injuries.

<http://www.ktuu.com/content/news/Light-earthquake-shakes-southern-Alaskas-Cook-Inlet-region-478391043.html>

Tokyo hit by 5.3 magnitude earthquake as "buildings shake" in Japan capital

Tokyo has been hit by an earthquake as buildings shook in the Japanese capital and promoted a slew of residents to express their worries on social media, it has emerged. Early reports are stating the ground shaking quake was of a 5.3 magnitude. The USGS confirmed the earthquake and downgraded it to a 5.0 magnitude. One resident declared that they saw buildings shake in the city while others expressed relief that "everyone is okay". One wrote: "Well just felt my first earthquake - in Tokyo. Everyone ok. Just a small jolt."

<http://www.express.co.uk/news/world/939132/Tokyo-earthquake-Japan-latest-magnitude-USGS-Asia>

Massive earthquake strikes off Australian coast

The huge 6.9 magnitude quake struck 96 miles from the town of Kokopowhich. It is home to about 20,000 people. Pacific Tsunami Warning Centre (PTWC) boffins issued a warning and forecast hazardous waves from the coast. A PTWC spokesman said: "Government agencies responsible for threatened coastal areas should take action to inform and instruct any coastal populations at risk. "Persons located in threatened coastal areas should stay alert for information."

<https://www.dailystar.co.uk/news/latest-news/692565/earthquake-news-papua-new-guinea-tsunami-alert-ring-of-fire>

Earthquakes - 2001-2015 (Video)

This animation shows every recorded earthquake in sequence as they occurred from January 1, 2001, through December 31, 2015, at a rate of 30 days per second.

<http://spaceref.com/earthquake/earthquakes---2001-2015.html>

Landslide computer modelling helps earthquake first responders

Just hours after the 7.8 magnitude Kaikoura earthquake hit New Zealand in 2016 research by Dr Tom Robinson, Department of Geography, was helping to inform the work of first responders in the area. At the time of the earthquake Dr Robinson was collaborating with colleagues from the universities of Canterbury and Otago in New Zealand, to test a computer modelling approach to predict earthquake-related landslides. When the earthquake struck, the team were able to use their modelling approach to generate information about where significant landslides might have blocked roads and rivers and share this information with first responders in New Zealand. The findings of their modelling approach are published in the Bulletin of the Seismological Society of America.

<https://www.dur.ac.uk/news/newsitem/?itemno=34146>

Revealed: Why some earthquakes are more devastating than others

A team of seismologists from UC Santa Cruz and California Institute of Technology has developed a new measurement of seismic energy that could help us understand why some earthquakes are more destructive than others. Unlike magnitude scales, which indicate an earthquake's relative size by measuring the amount of ground movement (or seismic waves with specific wave periods), the new measure - Radiated Energy Enhancement Factor (REEF) - reveals the complexity of different ruptures including variations in the amount and duration of slip along the fault.

<http://www.alphr.com/science/1008888/seismologists-devise-new-measure-earthquakes>

Potent Mexico City earthquake was a rare "bending" quake, study finds

Six months have passed since a magnitude 7.1 earthquake struck Mexico City, toppling 40 buildings and killing over 300, but the memory remains fresh. Condemned structures dot many neighborhoods, their facades crumbling. And after an earthquake 225 miles away in Oaxaca state shook the capital city again on 16 February, the city mayor said hospitals treated dozens of people for panic attacks. Seismologists, too, are still studying the 19 September earthquake, trying to better understand what's happening underneath Mexico City. Our new paper in Geophysical Research Letters brings critical findings to light.

<http://www.citymetric.com/horizons/potent-mexico-city-earthquake-was-rare-bending-quake-study-finds-3762>

Volcanic Activity

Scientists create 3D image of active volcano

Scientists have created what they say is the world's first 3D thermal image of an active volcano. The image of Stromboli in Italy was made using high-precision cameras mounted to an aerial drone. A team of geoscientists from the Universities of Aberdeen and Oslo are using the technology to detect subtle changes in the behaviour of the volcano. They hope it will be used to provide more accurate information on the likelihood of an eruption.

<http://www.aol.co.uk/news/2018/03/29/scientists-create-3d-image-of-active-volcano/>

Additional sources: ([Watchers](#)) ([Future Scot](#)) ([The National](#)) ([The Irish News](#)) ([IFLScience](#))

Europe's Most Active Volcano Is Sliding Into The Sea, And It Will Cause Devastation - ScienceAlert

Even the most fearsome forces of nature can't escape the laws of physics: the fiery furnace of Mount Etna is slowly sliding into the Mediterranean Sea at a steady rate, according to the latest measurements. It's the first time scientists have been able to observe the movement of a volcano in its entirety, thanks to more than 100 GPS stations dotted around the sides of Mount Etna, which have been logging positional data for the past 11 years. The slide is slow but has now become unstoppable, scientists say - and as the volcano sinks, we could be looking at a series of extra hazards for those around the area of Sicily, including the hordes of tourists and scientists who regularly turn up to take a peek at the natural wonder.

<http://www.sciencealert.com/europes-most-active-volcano-mount-etna-slowly-sliding-into-the-sea>

Additional sources: ([The Independent](#))

Caribbean volcano Kick 'em Jenny: Ships warned off area

Ships sailing in the Caribbean have been told to steer clear of an underwater volcano after it started showing increased seismic activity. The volcano, called Kick 'em Jenny, is located 8km (5 miles) off Grenada. The government of Grenada has imposed a 5km exclusion zone around Kick 'em Jenny after the alert was raised to orange, which means an eruption could take place within 24 hours. Seismologists said there was no imminent danger to the region. Prof Richard Robertson, of the West Indies Seismic Research Centre (SRC) in Trinidad, said there was no indication that the increased seismic activity would generate a tsunami.

<http://www.bbc.co.uk/news/world-latin-america-43400346>

Additional sources: ([Imperial College London](#)) ([Sailing Today](#))

Hawaii volcano blows: Kilauea spouts twisting streams of lava in rare phenomenon

Several land spouts of twisting lava were seen just above the Pulama pali at sunrise on Thursday, helicopter footage shows. Mick Kalber, a videographer who was aboard a Paradise Helicopters flights, said: "[A] pink rainbow, amazing land spouts and a veritable plethora of lava flows made for a spectacular lava overflight this morning.

<http://www.express.co.uk/news/world/939786/Hawaii-volcano-eruption-Kilauea-lava-footage>

Volcano erupts in Baku

The eruption lasted up to seven minutes and was accompanied by flames, which reached a height of about 100-150 meters above the volcanic crater. The eruption covers an area of up to 2 hectares and varies from 0.3 to 1.2 meters in thickness. There are ...

<http://www.azernews.az/nation/129494.html>

Wider coverage of satellite data better detects magma supply to volcanoes

Using satellite imaging, Penn State researchers for the first time identified a major magma supply into a reservoir extending almost two miles from the crater of a volcano in Nicaragua. This shows that volcanoes can be fed magma through nearby underground channels and could help explain how volcanoes can erupt seemingly without warning because the active center of the volcano exhibits little deformation activity. The findings are published today (March 28) in Geophysical Research Letters.

<http://www.sciencedaily.com/releases/2018/03/180328130736.htm>

Volcanoes, climate change, and the birth of Christianity

Volcanic eruptions in Iceland during the middle ages may have influenced the course of history.

<https://daily.jstor.org/volcanoes-climate-change-and-christianity/>

Listen to the first-ever recordings of volcanic thunder

Researchers were listening for thunder in the middle of a volcanic eruption. That's exactly what some researchers managed to record during eruptions of Alaska's Bogoslof volcano last year. They noticed that cracks and pops in the recordings lined up with the timing of volcanic lightning in the same area. Volcanic lightning occurs when eruptions that send a lot of ash into the atmosphere. During their speed run into the air, the ash particles rub against each other, creating an electric charge a lot like when you rub a balloon against your hair. As the particles spread out, that electric charge discharges into lightning....and apparently, thunder.

<http://www.popsci.com/volcano-thunder-recordings>

The secrets of garnet reveal source of water to fuel powerful volcanoes and earthquakes

Among geologists who study powerful earthquakes and volcanoes, there is a mystery: as one of Earth's tectonic plates slides beneath another in a subduction zone, water is squeezed from certain minerals, lubricating earthquakes and fueling volcanoes in hot spots like the Pacific Ocean "Ring of Fire." But equations that predict where the forces of subduction wring water from stone consistently point to locations far from the site of actual cataclysms. By applying a new spectroscopy technique to garnet containing fragments of quartz, metamorphic petrologist Frank Spear of Rensselaer Polytechnic Institute thinks he's solved the puzzle. His early research shows that the equations are incomplete, lacking the significant variable of "overstepping," the additional energy needed to initiate a process, in this case, the decomposition of water-bearing minerals.

<http://phys.org/news/2018-03-secrets-garnet-reveal-source-fuel.html>

Flying rocks spark fresh warnings about Japanese volcano that featured in James Bond film

Explosive eruptions at a volcano featured in a James Bond film have prompted authorities in Japan to issue heightened warnings of flying rocks within 2.5 miles of the crater. Increasing the alert to level

three following two huge blasts at Mount Shinmoedake the Japan Meteorological Agency said that rocks more than 50cm wide could be hurled from the volcano, which was used in You Only Live Twice as the exterior of the villain Blofeld's secret rocket base. Molten lava was seen running down one side of the crater.

<http://www.independent.co.uk/news/world/asia/mount-shinmoedake-japan-new-warning-flying-rocks-james-bond-a8249446.html>

Wildfires

Wildfire potential, April through July

"Wildfire activity will increase across portions of the nation in April. The central and southern Great Plains continue to experience significant wildland fire activity. While the activity observed is Above Normal, overall trends follow a traditional seasonal progression which keeps the fire potential elevated across these areas in early April but begins a westward shift further into the Southwest by month's end. Periods of concern will be wind events coupled with low humidities that impact fire activity. Other areas of concern are the Florida Peninsula, eastern Georgia and South Carolina where drought conditions linger. Elevated potential exists across coastal portions of Southern California where drought continues and across portions of eastern Montana where very dry residual soil conditions exist. Pregreenup fire activity could elevate during westerly flow wind events.

<http://wildfiretoday.com/2018/04/01/wildfire-potential-april-through-july-3/>

Wildfire loss in March three times higher than last year

Wildfire has gutted more than 300 hectare of forest cover in Uttarakhand in March, the damage in a month being three times higher than that of last year, official data shows. On March 29, forest fire destroyed computers, a printer, biometrics system and other infrastructure of a government high school at Chaukhutiya in Almora district. Students were in the playground when the incident happened. According to forest department figures, 330.646-hectare forest cover has been damaged since February 15 when the official fire season began, leading to an estimated revenue loss of Rs 5,87,155. In February, only 31 hectare was burnt posing a loss of Rs 33,525. Nearly 300 hectare has been lost within 29 days this month, causing a loss of Rs 5,53,630. Last year, 100.35 hectare was damaged in March posing a loss of Rs 1,72,963. In 2016, when the state reported the worst wildfire, only 43.15 hectare was burnt in March with a loss of Rs 52,475, forest department data shows.

<https://www.hindustantimes.com/dehradun/wildfire-loss-in-march-three-times-higher-than-last-year/story-9Wn9ZHhDMmntv2oRVholL.html>

Prepare for a wildfire like you would hurricane

Officials with the Florida Forest Service recommend families create an emergency supply kit, similar to one they'd put together before hurricane season. Stock it with: Three-days worth of nonperishable foods and three gallons of water per person Map marked with at least two evacuation routes - Prescriptions or special medical items - Change of clothing - An extra set of car keys, credit cards, cash or traveler's checks - First aid kit - Flashlight - Battery-powered radio and extra batteries Copies of important documents (birth certificates, homeowner's insurance policy, passports) - Pet food and water

<http://www.tcpalm.com/story/news/local/st-lucie-county/2018/03/30/we-prepare-hurricanes-but-we-also-need-ready-wildfires-maureen-kenyon/472637002/>

Governor signs wildfire legislation

Legislation sponsored by Rep. Tom Dent to improve wildfire preparedness and prevention was recently signed into law by Gov. Jay Inslee, according to a news release. House Bill 2561 will require the commissioner of public lands direct the wildland fire advisory committee to review, analyze and make recommendations on wildfire prevention, response and suppression activities. The advisory committee also will evaluate the existing fire mobilization process and identify potential efficiencies

or other reforms that may lead to a more effective, coordinated wildfire response.

https://www.dailyrecordnews.com/news/governor-signs-wildfire-legislation/article_98a0e177-c913-575b-84a8-54e9fd e67f32.html

EDITORIAL: California Paying the Price for Wildfires

In addition to the tragic loss of life and the devastating financial impact on the thousands of Californians who lost homes, businesses and agriculture, the state spent nearly \$1.8 billion fighting fierce wildfires, it was reported early this month. Much of that will be reimbursed by federal agencies — which, rather than actually being anything like good news for the American people, will help create an almost unbearable budget burden on the United States Forest Service, which can spend on few other line items these days other than fighting Western fires. Still, the state will need to come up with about \$371 million of that money, and that's on top of California's existing wildfire budget, the Legislative Analyst's Office told the state Senate Budget Committee.

<http://www.govtech.com/em/disaster/EDITORIAL-California-Paying-the-Price-for-Wildfires.html>

We're Entering an Era of Mega-Fire

A new book by Heather Hansen explores the complicated world of wildland-urban interface firefighting as it unfolded in the Cold Springs Fire near Nederland, Colorado

<https://www.outsideonline.com/2292106/era-mega-fire>

Extreme fire season expected; officials urge safety

Local, state federal and tribal agencies are getting ready for an extreme fire season. The New Mexico State Forestry Division says since Jan. 1, there have already been more than 140 wildfires in New Mexico. Of those, 90 percent were human-caused. Gov. Susana Martinez declared March 25-31 as "New Mexico Wildfire Awareness Week." On Tuesday morning, agency leaders came together to encourage everyone in the state to do their part to prevent forest fires. The theme of this week is, "it's not a matter of if, but when. Prepare now."

<http://www.kob.com/new-mexico-news/extreme-wildfire-season/4842747/>

Vast boreal forest in Alberta threatened by climate change

New research shows the boreal forest in Alberta will be dramatically changed in the decades to come due to human induced climate change. As the climate warms, droughts longer and more frequent and forest fires become more prevalent the study says up to half of the western province's vast boreal forest could be gone by 2100. The report was published this week in the journal *Ecosphere*, under the title, "Wildfire-mediated vegetation change in boreal forests of Alberta, Canada"

<http://www.rcinet.ca/en/2018/03/27/vast-boreal-forest-in-alberta-threatened-by-climate-change/>

In 20 Years, Wildfires Will Be Six Times Larger

Over the next two decades, as many as 11 states are predicted to see the average annual area burned increase by 500 percent, according to a recent study. That would mean a small fire, say 100 acres, becomes, on average, a 600-acre fire, with Idaho, Montana, New Mexico, and Nevada expected to increase 700 percent in burn size. It's a grim picture for future fire seasons—one that might be inevitable, because researchers have been able to check their work from current trends.

<https://www.outsideonline.com/2289216/20-years-wildfires-will-be-six-times-larger>

Wildfires destroy dozens of homes, force hundreds to flee in Australia

Australian authorities urged people to remain alert on Monday as wildfires that have destroyed dozens of homes, killed cattle and forced hundreds of residents to flee continued to burn out of control in the southeast of the country. No deaths or serious injuries were reported as of Monday morning, but the bushfires have caused extensive damage in rural areas of Victoria and New South Wales (NSW). At least 75 homes had been destroyed, authorities said. "We can't be 100 per cent

sure that everybody is accounted for... but each one of those homes that have been affected by fire will need to be looked at and just confirm that," NSW Rural Fire Service Deputy Commissioner Rob Rogers told Australian Broadcasting Corp.

<https://www.theglobeandmail.com/world/article-wildfires-destroy-dozens-of-homes-force-hundreds-to-flee-in-australia/>

Wildfires will likely get worse in western North America

The massive wildfires that burned in California, Oregon, Montana, Idaho and British Columbia in 2017 exhibited a disturbing trend: a marked increase in the amount of area burned. While it may have been an exceptional year in some respects, new research predicts that years like 2017 are likely to become more common over time. States in the interior western United States, in particular, may be faced with large increases in total wildfire area burned, potentially beyond anything that has been experienced in the past, according to the study, published in the journal PLOS ONE on December 15, 2017, as the 2017 fire season was ending. The study projects where the greatest increases in area burned are likely to occur across the western U.S. and Canada in coming decades, suggesting that large fires years, such as the recent ones in southern and northern California may become more common.

<http://earthsky.org/earth/wildfires-forecast-us-west>

The Energy 202: The next wildfire season starts soon. The government wants to use drones to fight it.

In response to the wildfires that have ravaged the Western United States last year, the federal government is planning to implement unmanned aircraft, which are increasingly cheaper to buy and deploy, more than ever to aid the efforts of firefighters on the ground.

https://www.washingtonpost.com/news/powerpost/paloma/the-energy-202/2018/03/05/the-energy-202-the-next-wildfire-season-starts-soon-the-government-wants-to-use-drones-to-fight-it/5a9cabcb30fb047655a06aa0/?utm_term=.a18aeb205daf

Landslides

Avalanches, landslides to increase in Kashmir, says DRDO study

The frequency of avalanches and landslides would increase due to warming of Himalayas, says a study of Defence Research and Development Organisation (DRDO). The study is authored by HS Negi, Neha Kanda, MS Shekhar and Ashwagosha Ganju from Snow and Avalanche Studies Establishment (SASE), a laboratory under DRDO. The recent study warned that rising trends in liquid precipitation over snowfall "can have a negative influence on Himalayan glaciers". "It will increase the frequency of hazards like avalanches and landslides during late winters," the study reads. Citing high rainfall and less snowfall for the flood threat in Kashmir in April 2017, the study analyzed that the increase in liquid precipitation over seasonal snow in winter has "induced enhanced melting and resulted in flood like situation".

<https://www.kashmirmonitor.in/Details/145918/avalanches-landslides-to-increase-in-kashmir-says-drdo-study>

New NASA Model Could Help Predict Landslides (Video)

A new NASA computer model identifies landslide hazards around the world every 30 minutes, potentially allowing scientists and first responders to get a jump on these natural disasters, a new study reports.

<https://www.space.com/40066-landslide-prediction-nasa-satellite-model.html>

Landslides are Canada's forgotten menace. How can we predict them and save lives?

Quebec received 350 reports of landslides in 2017 that caused property damage, nearly triple the recent average. Homes have been destroyed, a hydro tower was damaged and a major freeway closed for more than a month after ground gave away.

<https://www.theglobeandmail.com/canada/article-landslides-are-canadas-forgotten-menace-how-can-we-predict-them-and/>

Engineering student develops technology to predict and monitor landslides

New Zealand engineering student Johnathan Olds from University of Victoria, Wellington, has developed an automated technology solution that uses inexpensive battery or solar powered GPS sensors to provide advance notice of life-threatening landslides.

<https://www.createdigital.org.au/engineering-student-monitor-landslides/>

UGM-BPNB`s landslide warning system designated as international guide

The Landslide Early Warning System (LEWS), developed by Yogyakarta-based Gadjah Mada University (UGM) and the National Disaster Mitigation Agency (BNPB) has been adopted as an international landslide warning guide. The International Organization for Standardisation (ISO) officially designated LEWS as ISO 22327 after handing over the ISO certificate to the university at its Plenary Meeting Office in Sydney, Australia, on Friday. With over 40 million people in Indonesia vulnerable to landslides, it is considered one of the country`s deadliest disasters. "What we have achieved is the result of a long struggle," Teuku Faisal Fathani, one of LEWS` developers, said in a university statement.

<https://en.antaranews.com/news/114995/ugm-bpnbs-landslide-warning-system-designated-as-international-guide>

Kaikoura quake caused one of the largest underwater landslides in history

A massive underwater landslide caused by the 2016 Kaikoura earthquake moved more than 100 million dump trucks of mud and sand hundreds of kilometres, scientists say.

<http://www.newstalkzb.co.nz/news/national/kaikoura-quake-caused-one-of-the-largest-underwater-landslides-in-history/>

Drones will be used to investigate Auckland's big landslide threats as part of EQC-funded study

Indonesia has recorded more than 400 earthquakes between January and February this year, including the 6.1 Richter-scale earthquake that struck off the coast of Banten in the most western part of Java, an official at the Ministry of Energy and Mineral Resources said. "We are reporting that a total of 434 earthquakes have struck between January and February," head of the MEMR's Geological Agency, Rudy Suhendar, told reporters at a press conference in Jakarta on Monday (05/03). One of those earthquakes, which struck off the coast of Banten, caused tremors that were felt across cities in the western part of the densely-populated island, including in the capital. Rudy added that most of the earthquakes had a magnitude between 4 and 4.9 on the Richter scale. Nearly 2,900 buildings and houses in various areas of Indonesia were reportedly damaged from the earthquakes. The agency also recorded 252 landslides within the same period, which Rudy said took place in 25 districts, most of them in Java.

<http://jakartaglobe.id/news/indonesia-records-434-earthquakes-252-landslides-jan-feb-govt/>

Papua New Guinea landslides triggered by 6.8 magnitude earthquake

Several remote villages in Papua New Guinea have been decimated by landslides triggered by a powerful offshore earthquake. At 4.39am, PNG was struck by a 6.8 magnitude earthquake 103 km from Kokopo, the capital of East New Britain. Aftershocks from the quake collapsed the sides of Mt Sisa, an extinct volcano around which eight villages reside. This morning's shock is the latest in a series of powerful earthquakes that have rocked Papua New Guinea since late February.

<https://www.9news.com.au/world/2018/03/09/07/52/second-png-quake-triggers-landslides>

The science of landslides, and why they're so devastating in PNG

The Papua New Guinea government has declared a state of emergency in the region. There is growing concern over several valleys that have been dammed by landslides and are beginning to fill

with water, now ready to collapse and surge downstream, directly towards villages.

<https://theconversation.com/the-science-of-landslides-and-why-theyre-so-devastating-in-png-92933>

Expert Warns Bigger-than-expected Tsunami Could Hit Japanese Coastal Regions

The March 11th, 2011 disaster prompted the Japanese government to revise the estimated scale of tsunami that could hit coastal regions. But an expert says the revised figures may still be too modest. Tokoha University Professor Ikuo Abe, an expert on tsunami and disaster prevention, visited a temple in Numazu, Shizuoka Prefecture known to possess some puzzling historical records on tsunami. The documents indicate that in the 15th century, the area was hit by tsunami that reached 11 meters above sea level. That's much higher than the maximum 5-meter tsunami that Shizuoka Prefecture has projected in studies conducted after the March 11th disaster. Abe says he believes the 15th-century tsunami was not the result of a normal earthquake. He says a massive localized tsunami most likely occurred, possibly due to a landslide on the seabed that was caused by the quake. A mass collapse of soil in this kind of landslide can cause seawater to swell and produce a tsunami.

<https://www3.nhk.or.jp/nhkworld/nhknewsline/backstories/expertwarnsbiggerthan/>

GIS and Remote Sensing tools to analyze landslides

Landslides are one of the major disasters that occur in hilly region. They are unpredictable by nature and thus their analysis is complex to study. RS and GIS tools can be of utmost importance in analyzing the effect of factors on which the occurrence of a landslide event depends.

<https://www.geospatialworld.net/blogs/gis-and-remote-sensing-tools-to-analyze-landslides/>

Floods

Climate change: Ganges might swell to twice its capacity, flooding northern India

Several countries across the world face a serious risk of food shortage if temperatures go beyond the Paris Accords' agreed upon two degree Celsius rise over the next few decades. The biggest risk to food sustainability comes from floods and droughts. A new study carried out by the University of Exeter, has found that conditions might get so severe that rivers like Ganges and Amazon will likely swell up, flooding large regions. Ganges runs through China, Nepal, Bhutan, India, and Bangladesh. Over 630 million people live along this river and in the coming century, that number will only get bigger.

<https://www.ibtimes.co.in/climate-change-ganges-might-swell-twice-its-capacity-flooding-northern-india-765617>

Additional sources: (News Nation India)

Flooding in Fiji claims at least four lives after Tropical Cyclone Josie

Tropical Cyclone Josie has caused severe flooding in parts of Fiji, with four people reported dead and one missing. Fiji Village reported four people were dead, while a 19-year-old man was still missing after he was washed away by floodwaters. The category one cyclone is moving southeast, away from Fiji, but heavy rain and flooding is still affecting the country. The Fiji National Disaster Management Office tweeted about 9.45am NZT that water levels were slowly receding, and roads were starting to reopen.

<https://www.stuff.co.nz/world/south-pacific/102762287/flooding-in-fiji-claims-at-least-four-lives-after-tropical-cyclone-josie>

Additional sources: (Asia Pacific Report)

Super typhoon may flood one third of central Tokyo

One third of central Tokyo could be left under water and nearly four million people affected if a super typhoon strikes the capital causing storm surges, a new study from local authorities has warned. The Tokyo metropolitan government unveiled its first estimate of the Japanese capital's vulnerability to damage from typhoon-related high tidal waves Friday, as risks of storm damage

continue to increase globally. According to the report, 212 square kilometres (85 square miles), or one third of the capital's central area, could be inundated to a maximum depth of 10 metres (33 feet) if a super typhoon creates high tidal waves. A severe event of this type would be estimated to affect as many as 3.95 million people in the city, flooding business and entertainment districts as well as major railway stations, the local government said

<https://nation.com.pk/01-Apr-2018/super-typhoon-may-flood-one-third-of-central-tokyo>

Additional sources: (The Straits Times)

Floods Spark State of Emergency in Northern Greece (video)

A state of emergency has been declared in parts of northern Greece after a swollen River Evros broke its banks, causing widespread flooding. The village of Praggi was among the areas in Evros prefecture affected by the floodwaters earlier this week. Now, the Eastern Macedonia and Thrace regions have been declared to be in a state of emergency as the authorities attempt to prevent more damage from the rising floodwaters. Local officials had called upon the government to declare the region in a state of emergency after the river rose above dangerous levels at Pythio in Didymoteicho. The region's deputy governor, Dimitris Petrovic, said that the level of water in the river has been above dangerous levels for four consecutive days.

<http://greece.greekreporter.com/2018/03/31/floods-spark-state-of-emergency-in-northern-greece-video/>

Northern Ireland floods: Half a million pounds for rivers

Half a million pounds is to be spent fixing rivers in the north west of Northern Ireland which were badly affected by flash floods last August. The Loughs Agency will spend the money re-setting the courses of four rivers which overflowed their banks. Some of it will also be used to remove debris and manage overhanging trees. Fences will be erected along the banks to keep grazing animals out and improve water quality.

<http://www.bbc.co.uk/news/uk-northern-ireland-43595558>

Racing to avert a monsoon catastrophe in Bangladesh

Almost surrounded by a chest-deep stream, they know the coming wet season in Bangladesh could bring the deadly dangers they narrowly escaped in Myanmar. "None of us can swim," says Mohammad, a father of three. "If we are here in the monsoon, we will surely drown." With the rainy season a few weeks away, the Bangladeshi government, supported by UNHCR, the UN Refugee Agency and its partners, is in a race against time to avert a catastrophe threatening the world's largest refugee settlement. More than 670,000 Rohingya refugees have fled to Bangladesh since August to escape killings, arson and rape in Myanmar's Rakhine State, many settling spontaneously on the unsuitable hillsides around Kutupalong.

<http://www.unhcr.org/news/stories/2018/3/5aa9065f2d2/racing-avert-monsoon-catastrophe-bangladesh.html>

Homes Hit, Residents Evacuated As South Siberia Snowmelt Triggers Flooding

The government of Russia's Republic of Tuva in southern Siberia says the region has been hit by floods triggered by melting snow. In a March 29 statement, the Tuva government said 88 homes were hit by flooding in the Kyzyl district, adding that hundreds of residents were affected by the floods, while rescue teams are providing people with shelter and food. Authorities in the neighboring Republic of Khakasia announced a state of emergency on March 28 as snowmelt caused massive floods there as well. Authorities in the nearby Altai Krai, where a state of emergency was declared on March 27, said on March 28 that two men had died in the floods.

<https://www.rferl.org/a/russia-siberia-flooding-tuva-khakasia-altai/29132784.html>

Ten Years, Nine Floods: Local-Level Climate Adaptation in China

The Lanjiang river in Eastern Zhejiang, China, reached its peak water level of 100 feet the night of June 25, 2017. Lanxi residents remember this day as "6.25," marking the worst flood since 1955. Elsewhere in China that month, 7.3 million people were affected by floods, landslides, and heavy

rains in northwestern Sichuan Province alone. Northern Guangxi suffered direct economic losses of 2.9 billion RMB (US\$460 million). In the autonomous regions, 92,000 people were relocated. Flash floods caused the deaths of 10 people and forced 76,800 people to evacuate from Shanxi Province.

<https://www.newsecuritybeat.org/2018/03/ten-years-floods-local-level-climate-adaptation-china/>