Weather records broken as world faces alarming levels of change

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This included the highest level of ocean warming on record and the most extensive melting of winter sea ice in the Arctic. A billion people in South Asia also suffered an unprecedented killer heat wave.

“The alarming rate of change we are now witnessing in our climate as a result of greenhouse gas emissions is unprecedented in modern records,” said Petteri Taalas, secretary-general at the WMO.

The WMO says that new temperature records are already being set this year, with average global air temperatures in January and February the highest for those months on record. “The startlingly high temperatures so far in 2016 have sent shockwaves around the climate-science community,” said David Carlson, head of the WMO’s World Climate Research Programme.

But while air temperatures fluctuate – with the mercury soaring in 2015 partly because of a major El Niño event – the WMO says the real signifiers of global warming are the oceans.

From more than 3000 ocean temperature sensors established at the start of the century, it says that global ocean heat content reached record levels to a depth of at least 2000 metres in 2015.

More than 90 per cent of the excess heat trapped in the atmosphere by rising concentrations of greenhouse gases finds its way into the oceans, says Matthew Palmer of the UK Met Office in Exeter.

Heat imbalance

The steady ocean heating recorded by the sensors, called the Argo array, implies a planetary heat imbalance, in which between 0.65 and 0.8 watts more energy is being absorbed for every square metre of Earth’s surface than is being released, says Palmer, who published his findings last month.

In the Arctic Ocean, a combination of warming ocean waters and rising air temperatures meant that in 2015, winter ice peaked at 14.54 million square kilometres on 25 February – less than at any time since satellite measurements began in 1979. And new record lows were set in the first two months of 2016.

According to the US government's National Oceanic and Atmospheric Administration (NOAA), Arctic air temperatures began 2016 at 4 °C above the average for the mid-20th century.

The situation in the Arctic records was countered in the southern hemisphere, where the summer minimum extent of sea ice was the fourth-highest ever recorded. The WMO says nobody is quite sure why.

But where people live, the heat has been unrelenting, with rising average temperatures triggering a bout of local record highs.

Last summer, heat waves battered India. Temperatures exceeding 47 °C caused thousands of deaths – a phenomenon that Indian meteorologists dubbed a "heat bomb".

Meanwhile, temperatures in southern Africa hit a record 48 °C, and across Europe several new temperature records were broken – for example, 40.3 °C in Germany, 42.6 °C in Spain, and 36.7 °C in the UK.

Climatologists are predicting new records highs for 2016.