

What is happening to our weather?

One weekend in May 2010, Nashville in the USA was expecting a few centimetres of rain. Two days later, 33 centimetres had fallen and eleven people had died in the resulting floods.

There's been a change in the weather. Extreme events like the Nashville flood – described by officials as a once-in-a-millennium occurrence – are more frequent than before. Also in 2010, 28 centimetres of rain fell on Rio de Janeiro in 24 hours, causing mud slides that buried hundreds of people. And record rains in Pakistan led to flooding that affected more than 20 million people. The following year, floods in Thailand left factories near Bangkok under water, creating a worldwide shortage of computer hard drives. Meanwhile, severe droughts have affected Australia, Russia and East Africa. Deadly heat waves have hit Europe, leaving 35,000 people dead in 2003. Financial losses from such events jumped 25 percent to an estimated \$150 billion worldwide in 2011.

What's going on? Are these extreme events signals of a dangerous, human-made change in the Earth's climate? Or are we just going through a natural run of bad luck? The short answer is: probably both. On the one hand, the most important influences on weather events are natural cycles in the climate. Two of the most famous weather cycles, El Niño and La Niña, originate in the Pacific Ocean and can affect weather patterns worldwide. But something else is happening too: the Earth is steadily getting warmer, with significantly more moisture in the atmosphere. The long-term accumulation of greenhouse gases in the atmosphere is trapping heat and warming up the land, oceans and atmosphere. As the oceans warm up, they produce more water vapour and this, in turn, feeds big storms, such as hurricanes and typhoons.

And yet, there are ways of dealing with the effects of such extreme events. After 2003, French cities set up air-conditioned shelters for use in heat waves. In the 2006 heat wave, the death rate was two-thirds lower.

'We know that warming of the Earth's surface is putting more moisture into the atmosphere. We've measured it. The satellites see it,' says climatologist Jay Gullledge. Another scientist, Michael Oppenheimer, agrees. We need to face up to that reality, he says, and do the things we know can save lives and money.