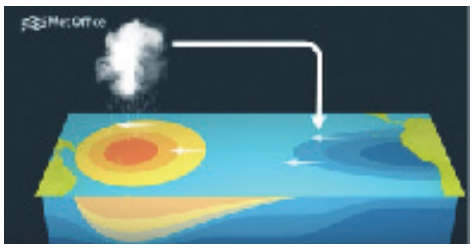
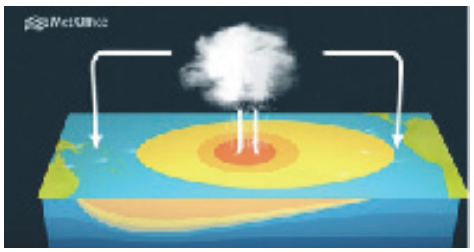
El Nino and La Nina

What is the El Nino?

In a normal year trade winds blow consistency from east to west over the Pacific Ocean. This pushes the warmer water to the West, around the coastlines of Australia and the Philippines. The movement of the water means that in the East the water is replaced by colder water from underneath, this is called a **cold upwelling**. Due to the warm water low pressure system form with rising air, with creates a cycle of warm air falling and dry air falling.



However in an El Nino year the trade winds weaken. This means that the **warm water is not pushed to the West**, leaving it over most of the Pacific Ocean. There is also **less upwelling**.This means that dry air is falling in both the East and the West. This has a **knock on effect around the world**.

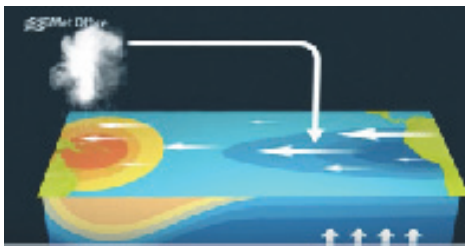


Impacts of the El Nino:

2015	*1997-1998*
- The Atacama desert has experienced flash flood when they normally only receive around 1cm of rain a year. Heavy rainfall also occurred Mexico and Peru, increasing mudslide frequency. - There has been wetter weather California - A colder and drier winter in Europe is predicted - There has been an increase in the frequency of typhoons in Taiwan and China. - Western Australia has had the worst bush fires the season has ever seen. It is also drier in Asia, New Zealand and Indonesia. - A reduction in the number of tornadoes and hurricanes seen - Southern Africa has experienced droughts, whilst East Africa has had floods.	- Warmer summers in Holland and Belgium - Winters in areas around Japan were also warmer - In India it was a lot drier which lead to severe droughts in some areas - Heavy tropical storms hit Central America and South America - In Argentina there was wetter weather with a large amount of heavy rain - Places such as Niger and the Ivory Coast in Africa saw drier weather

What is La Nina?

La Nina is the opposite of El Nino, it occurs when the **trade winds strengthen**, which causes a greater upwelling of cold water across the Pacific Ocean, this intern means that La Nina generally has the opposite effects of the El Nino.



Impacts of La Nina 2011:

- The amount of rainfall in the Philippines and Indonesia was higher than normal, with it being below average on the West coast of South America
- More violent hurricanes hit the Caribbean and East coast of USA
- Eastern Africa, California and South America suffered from long droughts
- Southern Africa and Australia (Queensland) experienced an increase in rainfall and therefore floods

The Growth of Hazards

Physical factors such as the ENSO increase the number of natural hazards, but humans also play a part in the growth of hazards and therefore leads to **increased vulnerability**. There are a number of factors, which are:

1. *Rapid Population Growth* - The world population has quadrupled between 1900 and 2000 from 1.65 million to just over 6 billion. The growth of the population simply means that there are **more vulnerable people on the planet**. There is also pressure on the land, forcing people in areas to live on high risk land (e.g people live on the beaches and flood plains in Bangladesh). Finally there are more elderly and young people who are vulnerable in disasters.

2. *Deforestation and Land Degradation* - **deforestation** means that there is less interception and therefore soil gets saturated quicker, leading to an increase in the risk of landslides. **Coastal erosion** and flooding increased due to the destruction of mangroves. **Desertification** occurs as people over farm land and deforest areas.
3. *Urbanisation* - as rural to urban migration increases there is a development of 'squatter settlements' and more a **greater number of vulnerable people**.
4. *Poverty and Politics* - developing countries have higher death tolls from earthquakes as they don't have money to build aseismic buildings. Furthermore they cannot prepare for disasters, and many people are poorly educated with little means of communication. Corrupt governments may misuse resources or prevent international air from reaching their population (e.g Myanmar following the 2004 Asian tsunamis)

There are some hazards which are growing in either their magnitude or frequency. There are several examples which all have various underlying physical and human factors, these are:

1. Floods:

The frequency of floods has increased since 1980, there have been major river floods in Thailand (2011) and Pakistan (2010). Extreme rainfall, mid latitude depressions and tropical cyclones were responsible. Looking a this trend we can see that it is consistent with:

- global warming – increase evaporation and speeds up global atmosphere circulation
- population growth – development occurring on flood plains, **increasing vulnerability.**
- **widespread deforestation — due to population growth means that there is increased run off and heightened flood risks**

2. Cyclones:

The 2004-2005 hurricane season for N America and Caribbean produced a record breaking number of storms, with 5 category 5 hurricanes. Hurricane Katrina featured in this causing $100 billion in damage and over 1,100 deaths. Causes of this are:

- **global warming — the warming of the oceans by 0.6°C means that hurricanes are more likely to form with an increased amount of evaporation.**
- **The El Nino and La Nina Pacific SSTs anomalies.**

Climate models predict that there is going to be an increase in the number of mid latitude cyclones in the UK in the next 30-40 years. This is again due to global warming, as well as a shift in the main storm track in the Atlantic.