

# EXTREME WEATHER

POWERFUL FORCES ARE COLLIDING

PRESENTED BY LOCKNEED MARTIN

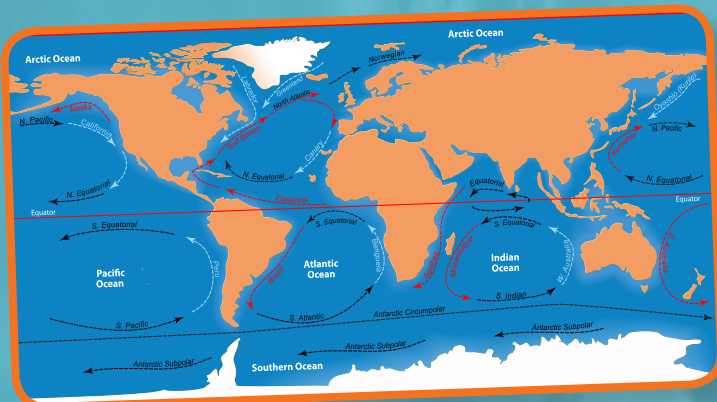
# EXTREME FACTS!


## IT'S ALL CONNECTED


Changes in earth's climate is not actually new for our roughly 4.5 billion year old planet. We know that earth gets hot and cold flashes—each lasting tens of thousands of years. These periods of warm and ice ages are called *natural cycles*. Right now we are in earth's latest warm period. The planet's heat is turning up like no natural cycle in history. And while El Niño and La Niña are present-day examples of natural cycles on a smaller scale, our increasingly frequent weather-to-the-extreme—violent storms, extended droughts, accelerated ice melt and warmer oceans—is alarming. Today, scientists are learning how fast the changes are happening and what we can do to prepare for the consequences—of higher sea levels and increasingly severe storms and drought.


But what does a hurricane on the East coast of the United States or a fire in the drought stricken West have in common with accelerating ice melt in the Arctic and extreme weather around the globe? The oceans, of course, are the key. Sea levels, temperatures and currents, wind, and air temperature all work together to create weather patterns around the world. When one thing is altered, it changes the weather everywhere.


## THE BIG BLUE




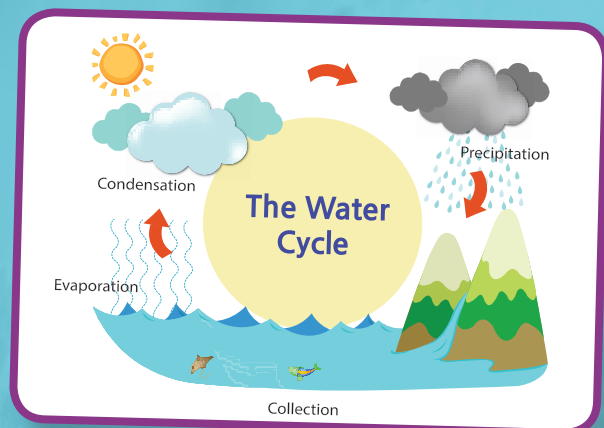
 The ocean plays a critical role in warming the planet: Covering more than 70 percent of the earth's surface, it absorbs nearly all of the sun's radiation, acting like a giant solar panel.

 Not only does it take all that solar radiation off our hands so that the earth doesn't become an inferno, the ocean redistributes the warmth through evaporation (warm water turns to vapor, aka the *Water Cycle*)—so no place on earth gets too hot or too cold.

 That evaporating trick creates a rise in air temperature and humidity, which in turn creates rain and storms. Winds take these storms to land. Ocean currents keep these conditions moving through the world.

 According to NASA, global sea level rose nearly three inches in the last 20 years! Eleven out of 15 of the world's largest cities sit on a coast.

 Ocean temps are on the rise: Since 1969, NASA says that surface temperatures have risen 0.302 degrees Fahrenheit. That might not sound like a lot, but think about it: The warmer the ocean, the more ice melt, the more evaporation; the more evaporation, the more temperature, humidity, and rainfall increases. Can you see how this pattern can get extreme with accelerated warming?



## DISRUPTERS!

WARNING!  
LA NIÑA

WARNING!  
EL NIÑO

- They are short-term climate disrupters, and start with water temperature changes in the tropical Pacific Ocean. While La Niña stirs up cold water, her more popular brother El Niño stirs up warm water. Both affect weather the whole world over, and both have fairly predictable patterns—every 3-7 years—yet no one pattern is exactly alike!
- There are typically fewer hurricanes in the Atlantic Ocean in the United States, but an increased number in the Pacific Ocean, called cyclones, during El Niño.

