The Economist

Climate science (I)

Seasons of discontent

El Niño, a worldwide fluctuation in the climate, may provoke civil war as well as inclement weather

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BELIEVERS extol the infant Christ, after whom the global climate oscillation El Niño is named, as the Prince of Peace. Not so, according to a new analysis by Solomon Hsiang of Columbia University and his colleagues. Looking at data on weather and warfare from around the world over the past six decades, Dr Hsiang finds that in those countries where El Niño exerts its effects it brings with it a significant extra risk of civil conflict. The results, published in *Nature*, cannot be translated into a prognosis for the effects that global warming may have on ancient grudges and new mutinies. But they provide a striking insight into the ways that geography can shape human affairs.

The work starts with two well-established sets of data, one on violence and the other on the weather. From the first the team calculated an "annual conflict risk" for violence within countries (as opposed to cross-border wars). From the second it produced a map of the world divided into 82 countries where the weather pays little heed to the presence or absence of Niños and 93 where the weather does pay such heed—a group that covers almost all of the tropics. Niños are sloshings of warm water across the equatorial Pacific that take place once or twice a decade. They mostly make themselves felt by increasing tropical temperatures and lowering rainfall around the tropical world, though the effects are not the same everywhere. Such semi-regular instability is not experienced in temperate climes, and it has deep repercussions.

In years of El Niño, the researchers found, the annual risk of conflict in their 93 tropical countries was 6%. When the oscillation reached its other extreme, a situation known as La Niña, the risk was 3%. In other parts of the world it stayed pretty stable around 2%. This is not to say climate is the only or main factor behind conflict. But the researchers' numbers suggest that as many as a fifth of the internal conflicts of the period were affected by El Niño.

Further analysis backs up the idea. Though the name comes from effects felt in South America around Christmas time, Niños start to hit their stride in April and May. This makes it reasonable to expect their impact to show up more in the second part of the year than the first. And in years of El Niño the onset of conflicts in the susceptible 93 was indeed skewed late, with a bulge from September to November. There is no such bulge in years of La Niña, nor in places that do not respond much to Niños. An interesting further pattern is that the poorer the country, the more

strongly its chances of internal conflict seem to be tied to El Niño.

The correlations seem robust, as does the direction of causation. Though humans can affect the climate, the intention of fighting a civil war is unlikely to change the temperature of the tropical Pacific. The mechanisms, as always in such matters, present more of a problem.

Poor harvests—which Niños often cause—might make recruiting rebels cheaper, as there is a slacker labour market. They might heighten tensions between people in cities and those in the countryside. They might reduce the ability of governments to buy off trouble. And hotter weather may make some sorts of fighting more likely. In baseball it has been found that if one team's pitcher hits a batter with the ball, the likelihood of the other team's pitcher retaliating in kind goes up with the temperature. Ramping up retaliation like this is a good way of increasing the chances of strife.

Sire, sire, the peasants are revolting

At least one previous study, published in 2009, has claimed a relation between unusually hot years and the risk of civil strife. It detected such a link in Africa (though there have been arguments about its methods, and a string of relatively conflict-free years after the period examined weakens the effect). Dr Hsiang is not sure, however, that that connection has anything to do with El Niño. The Niño effect he found seems to hold up even when statistics are used to remove the direct influence on local rainfall and temperature, which was what the African study dealt with. If that is right, something subtler in the weather, or some systematic economic factors, must be involved. Historians have also pointed to links between particularly severe Niños and episodes of serious strife. The Boxer uprising in China in 1900, for example, was spurred by a Niño-related famine. And the French revolution—not tropical, to be sure—began with crop failures that some have linked to a whopper of a Niño then getting under way.

What will happen as the planet warms further? If Niños were expected to get more common there might be a clear implication. But climate modellers do not agree on what will become of El Niño in the future. They point only to a general warming with an average year-on-year increase much smaller than the difference between a normal year and a Niño year. How people respond to year-on-year changes, which is what the Niño work and earlier studies on temperatures pick out, may have little to do with how they respond to changes that take place over decades.

Yet Dr Hsiang thinks the Niño analysis shows an example of a clear link between climate and conflict, and that this puts a new onus of proof on anyone saying that no such link will be at work as the climate changes in the future, even if it does not show what that future link might be.

It does, though, bring up a pair of somewhat gloomy insights. One is on the limits of adaptation. In a world that is not doing much to mitigate climate change, an increasing emphasis is put on the capacity to adapt to it. That El Niño, which has been around for all of history, exerts strong effects on agriculture and on violence highlights the difficulties that poor countries have in adapting to familiar climatic challenges, and thus calls into question any hope that they might easily respond to new ones. Getting richer helps, but the worst-hit countries are those where development has proved hardest to come by.

And then there is the pessimist's reading. People do adapt to climate challenges—by fighting each other.

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