

It Ain't Just the Heat, It's the Humanity

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Evidence and Implications of a Knowledge-Based Consensus on Man-Made Global Warming

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What Makes Consensus “Knowledge-Based”?



There is an overwhelming scientific consensus that humans are warming the climate. *Miller* (2013) contends that when consensus is “knowledge-based” (achieving social calibration, consilience of evidence, and social diversity) it is less likely to be faulty or incorrect, and can be considered approximately true.

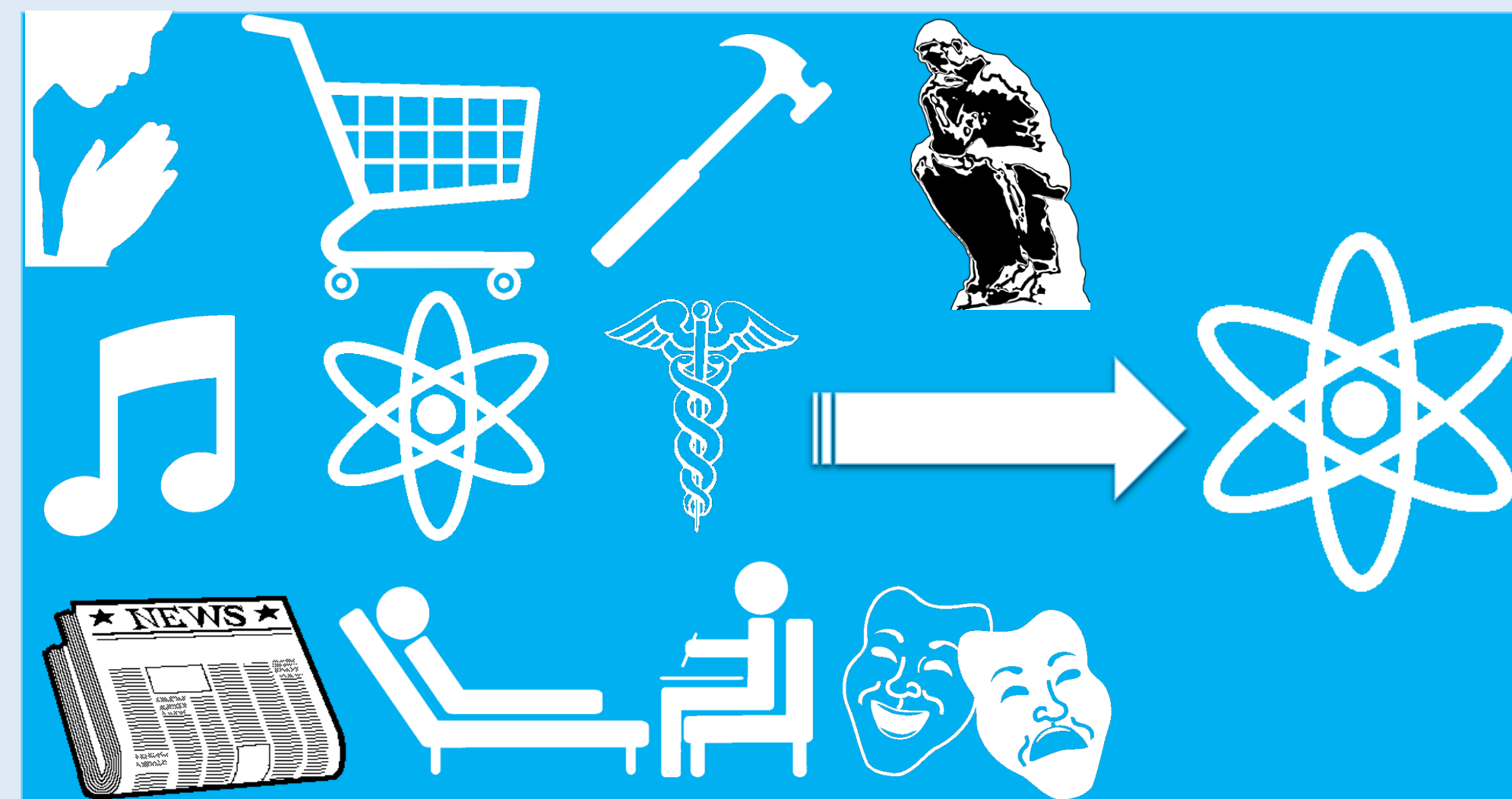
Incorrect consensus can arise from bottom-up bias, such as epistemic luck- incorrect agreement arises because evidence happens to point to the right conclusion for the wrong reason (i.e. broken clock), or because chance gives the appearance that the right conclusion is incorrect. False consensus can also arise due to top-down biases such as *non-cognitive* agreement, which are not knowledge-based and form regardless of whether the consensual view is correct, such as “consensus” among tobacco companies that cigarettes are safe.

Top-down bias

Bottom-up bias

Social Calibration as a Condition of Consensus

Knowledge-based consensus vs. superficial consensus depends on social calibration, or “shared evidential standards, formalism and ontological schemes”. Climate scientists and experts publishing in peer reviewed physical science journals enjoy social calibration with each other, whereas politicians who believe in divine revelation will have different standards of “evidence”.



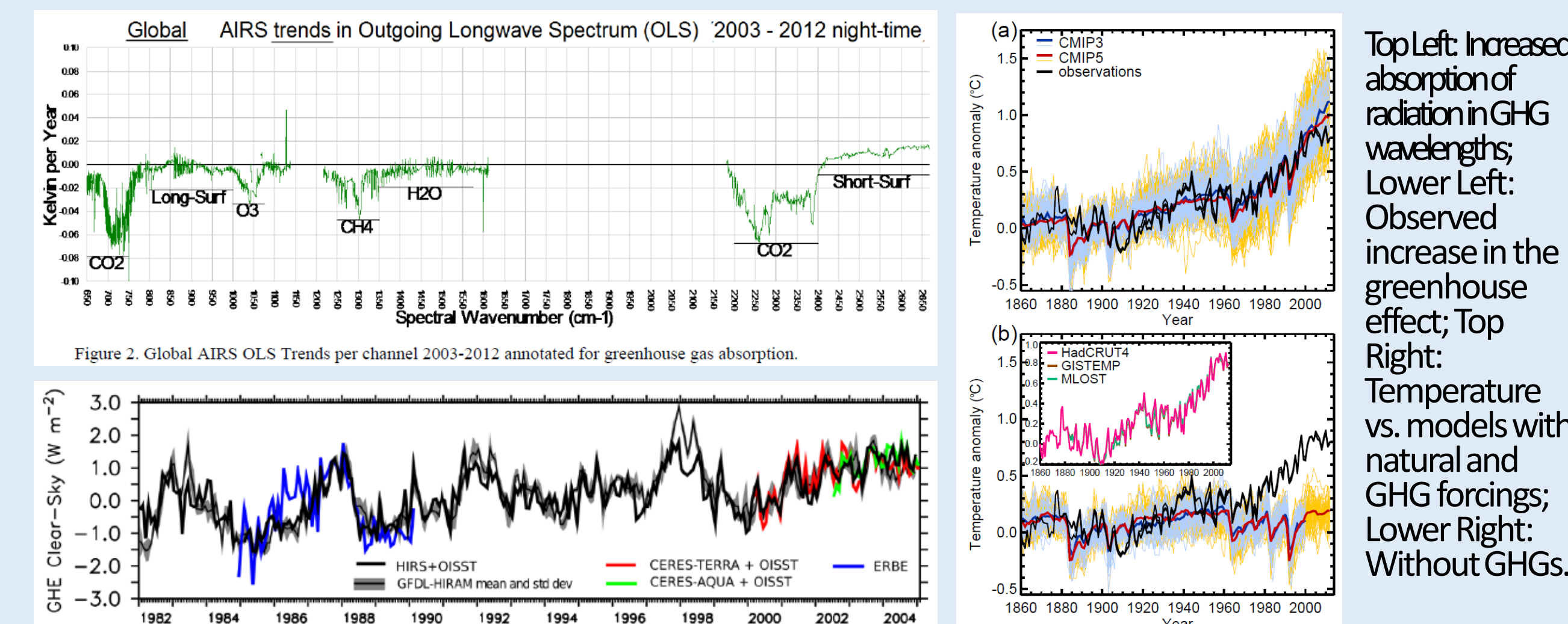
Institutional Affiliations of the Authors



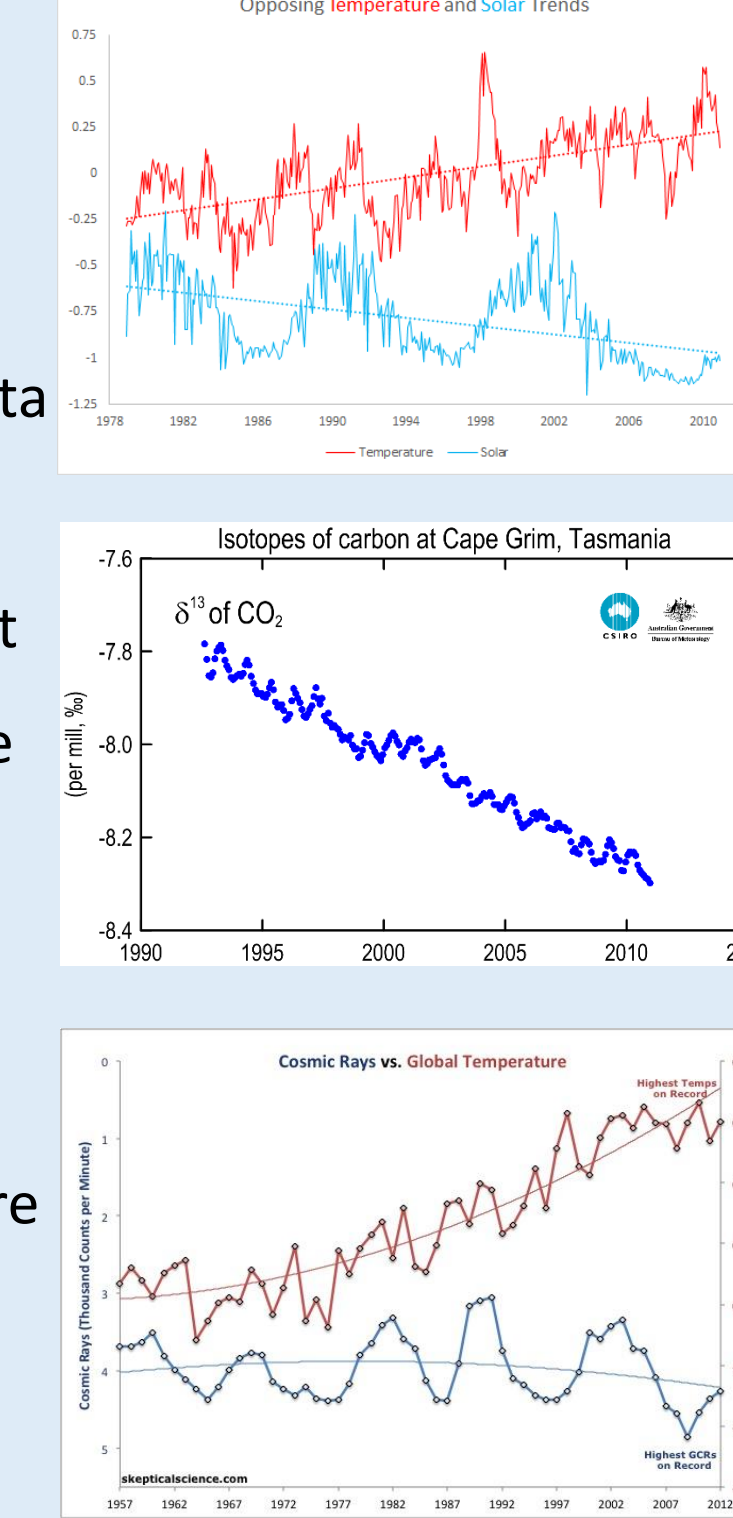
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The Consilience of Evidence for Man-Made Warming

Consilience is achieved when multiple lines of independent evidence pointing to one conclusion and agreeing with each other. Observed increases in the greenhouse effect represent some of these lines.



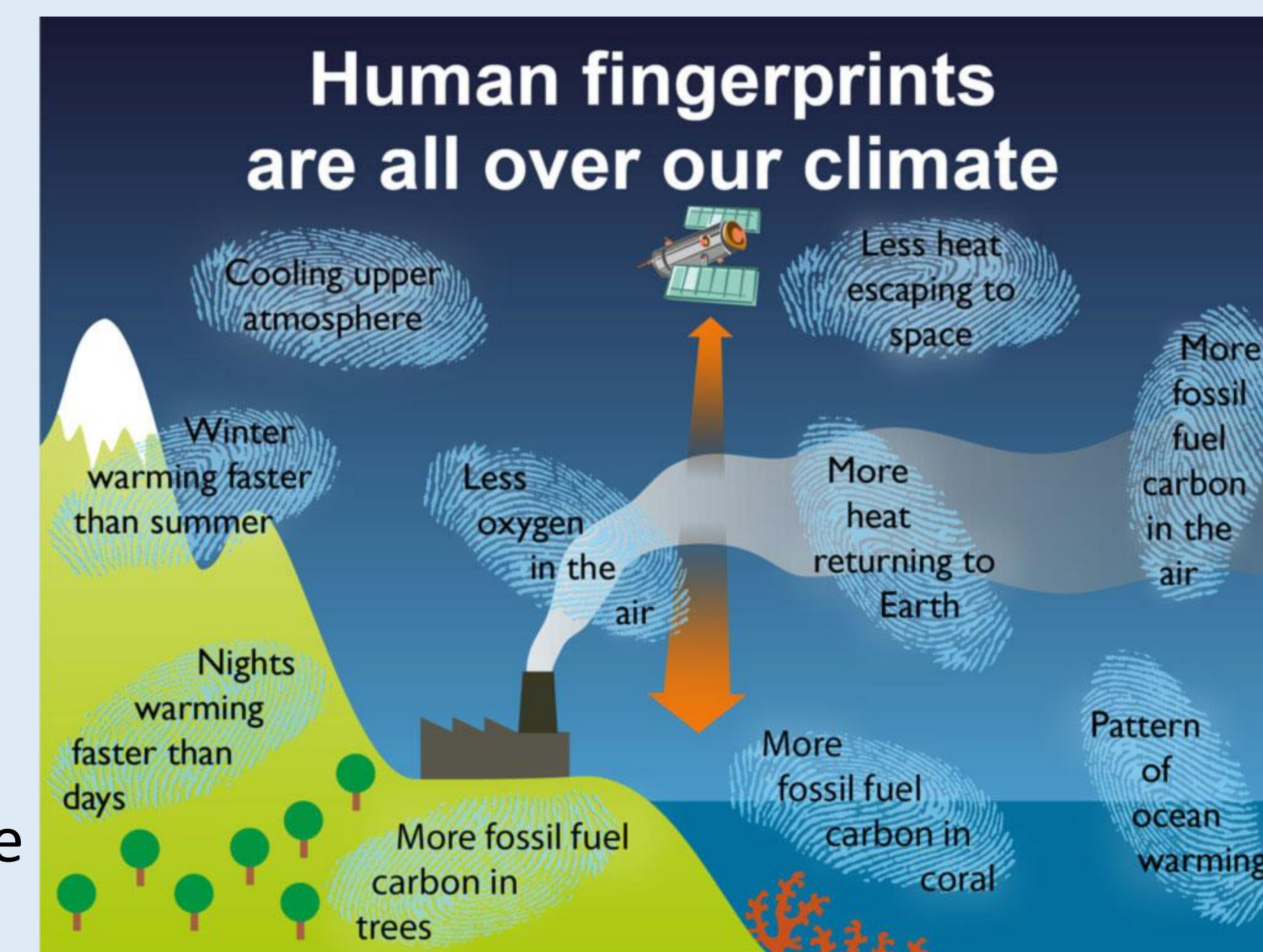
Top: Opposing trends in satellite observations of temperature and solar irradiance (temperature data from UAH, solar data from PMOD). Middle: Declining ¹³C isotopes in atmospheric CO₂ at Cape Grim, Australia, indicative of fossil fuel combustion vs. oceanic or volcanic origin of increasing CO₂ (image from NOAA). Bottom: Opposing trends in surface temperature and cosmic ray flux (inverted to show causal sign; image from Skeptical Science).



In addition to observed evidence of an anthropogenically-enhanced greenhouse effect, we can rule out other potential drivers by observing their behavior directly. Solar activity, volcanoes, and cosmic rays are often-cited alternatives to the consensus. However, in addition to their incompatibility with the evidence for anthropogenic warming, their behavior itself is inconsistent with the observed climatic change. Solar and cosmic rays are trending in the wrong direction, and volcanic sources of carbon are not depleted in ¹³C.



Consilience of evidence is a fundamental tenant of science and a powerful communications opportunity. Presenting dozens of graphs from different studies demonstrating the human cause of warming can result information overload to a lay audience. Consolidating different lines of evidence into infographics (such as this one from Skeptical Science, right) is a better alternative. Anchoring complex messages to existing mental schema is a good method for making ideas “stick” (Heath and Heath, 2007). Here, the schema of “fingerprints” appropriated from forensics is used to reinforce attribution. Symptoms of a medical illness and other schema can also be effective.



Social Diversity and the Consensus on Climate

80 National Science Academies from countries across the globe endorse the consensus. None oppose it.

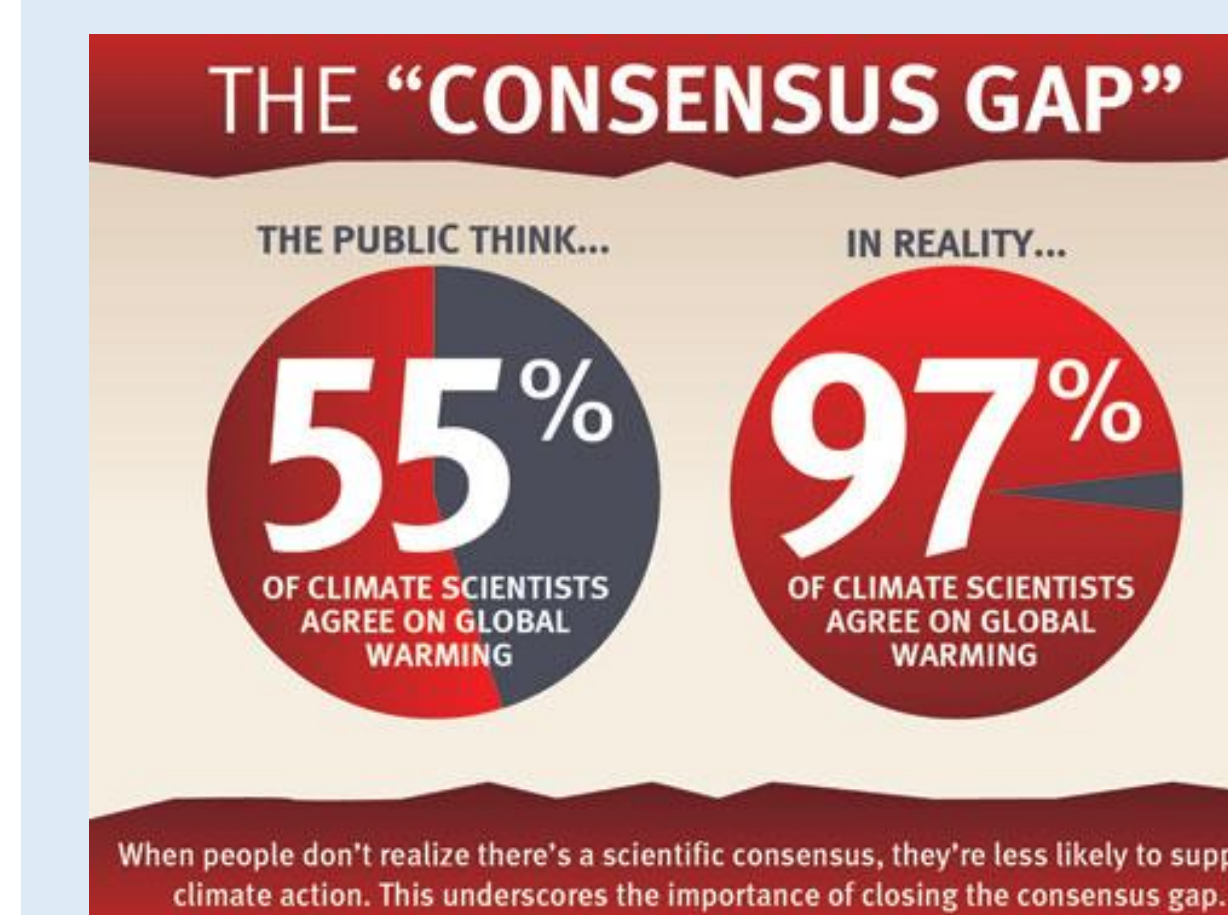


Even corporations with a vested interest in denying the consensus have publicly endorsed it.

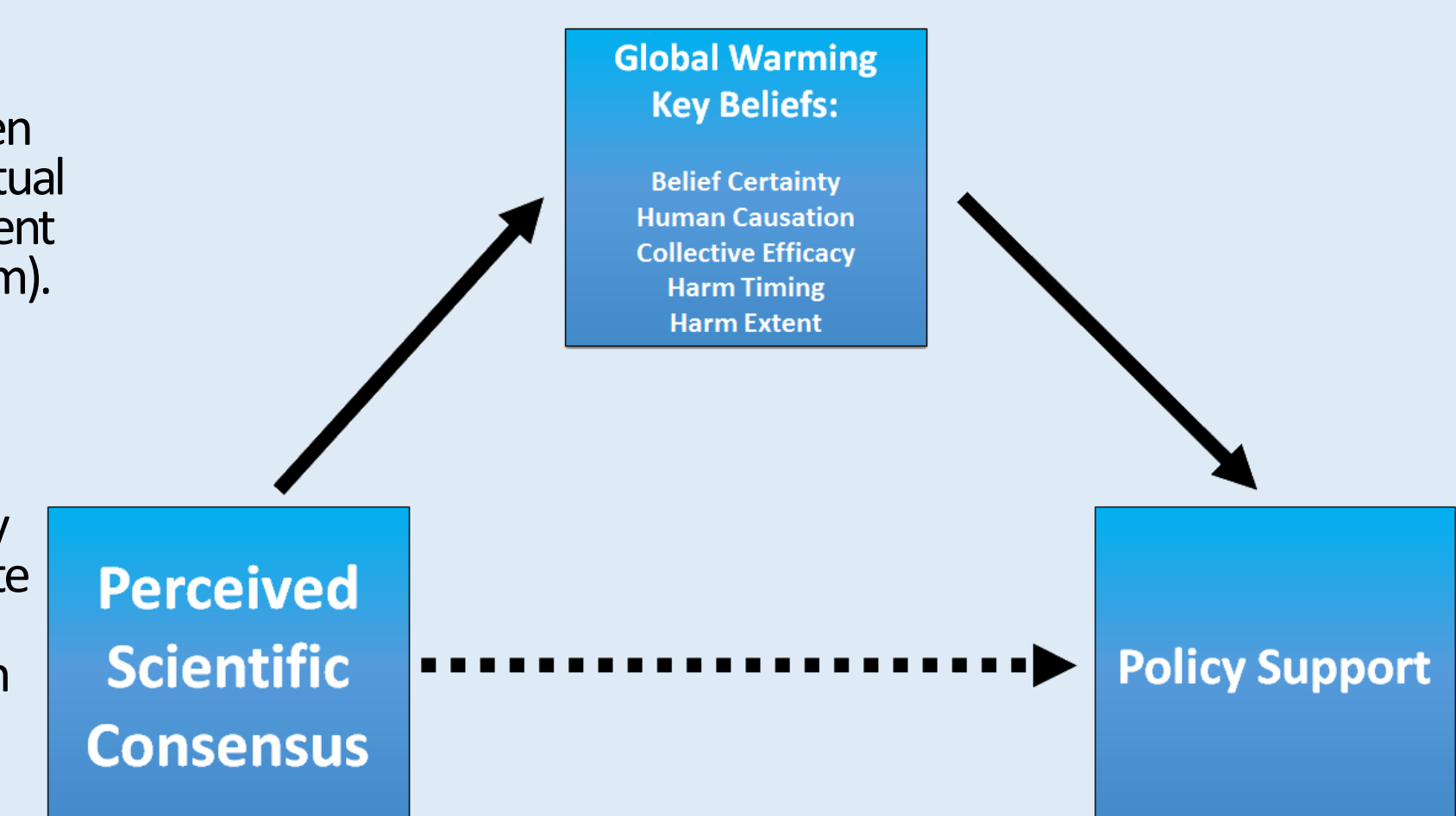


Social diversity inoculates consensus forming incorrectly by preventing bias arising from in-group homogeneity (i.e. groupthink), such as that which led to American geologists rejecting plate tectonics for longer than their European counterparts, as well financial incentive (such as with tobacco-funded scientists).

The Consensus, Public Belief, and Support for Action



Left: Gap between perceived and actual scientific agreement (Cook, pers. comm). Right: Public perception of consensus as a driver of public acceptance of key facts about climate change as well as support for action (adapted from Ding et al., 2011).



Despite the overwhelming scientific consensus on anthropogenic warming, the public perceives a divided scientific community. Being aware of the high level of agreement among experts increases public belief in key facts about climate change (including human causation), as well as increasing belief that action should be taken, including policy changes (Ding et al., 2011; Lewandowsky, 2012; McCright et al., 2013).

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