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## Opinion

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### Are we heating the planet? PRO: Evidence of global warming is conclusive, and denial is dangerous

RAYMOND S. BRADLEY AND MICHAEL E. MANN;

The evidence for global warming is unequivocal. Temperatures in recent decades have risen to levels that the Earth has not experienced for well over 1,000 years. Nine of the 10 warmest years in the last 150 years have occurred since 1990.

These changes in temperature have been accompanied by exceptional changes in our environment. Ice cover on the Arctic Ocean has been dramatically reduced in thickness and extent. In Alaska, the frozen tundra has been thawing out, disrupting roads, buildings and other infrastructure. In the Pacific Northwest and Alaska, millions of acres of forest have been destroyed by bark beetles that are now able to winter over, because temperatures are warm enough for them to survive year-round.

What has caused global warming? In 2001, a comprehensive report by the Intergovernmental Panel on Climate Change (IPCC), written by leading climatologists from around the world, concluded that the buildup of greenhouse gases (from fossil fuel use) has had a clear impact on global climate over the last few decades.

Greenhouse gases, such as carbon dioxide and methane, absorb energy emitted by the Earth, causing temperatures to rise. There is now 30 percent more carbon dioxide in the atmosphere than there was in preindustrial times, but half of this excess has been produced since 1965. Similar changes have occurred in the levels of other greenhouse gases.

Not surprisingly, temperatures have risen sharply in the last 20 to 30 years, in line with climate model predictions. The conclusions of the IPCC that global warming is real, and will only get more pronounced in the future, represents the consensus of the worldwide scientific community.

A blue ribbon panel of U.S. scientists, convened by the National Academy of Sciences at the request of President Bush, subsequently evaluated the major conclusions of the IPCC report and solidly endorsed them.

In arguing that combating global warming would be a waste, astronomer Sallie Baliunas (see accompanying article) promotes an unwise policy of inaction on climate change by misrepresenting the state of scientific knowledge about global warming.

Her own industry-funded study, upon which she bases her arguments, has been soundly rejected by mainstream researchers, as detailed in news articles in The Wall Street Journal, Scientific American and Discover magazine. Her arguments were recently discredited in an article in the scientific publication Eos (the journal of the American Geophysical Union), co-authored by 13 leading professional climate scientists from diverse institutions in the United States and Britain.

These authors emphasize that their conclusion - that late-20th century hemispheric-scale warmth is unusual in at least a millennial context and that human factors likely play an important role in explaining it - represent the robust consensus view of mainstream climate researchers (scientists who are actually trained in climate

science and publish their work in professional scientific journals).

Baliunas seeks to deny these conclusions through the selective citation of evidence that might appear to bolster her claims. For example, she tries to impress us with the observation, "England's climate was warm enough in the 12th and 13th centuries to support more than 50 vineyards," which she offers as evidence of unusual warmth during medieval times.

She neglects to mention the evidence indicating unusually cold conditions in many other regions at precisely the same time. Furthermore, she forgets to mention that there are more than 350 thriving vineyards in England today.

Does this mean that temperatures are seven times as warm today as they were during the Middle Ages? Of course not. But this does illustrate the misleading way the facts are often used by those wishing to deny the existence of human-induced climate change.

Unless the current rate of fossil fuel consumption is reduced, within a few decades carbon dioxide levels will be higher than at any time in the last 20 million years.

The lessons of climate history alert us to the fact that the recent changes are not part of the "normal" ebb and flow of the climate system. They result from our global-scale interference with Earth's atmosphere.

With more than 6 billion people on Earth today, many living in abject poverty, and world population expected to reach 9 billion in the next 70 years, we cannot afford to gamble that our effects on global climate will be minimal. We just cannot pin our hopes on unsupported speculation that the climate system will somehow bring these unprecedented and rapid changes into balance.

Ignoring the problem will cost us dearly as we struggle to deal with the societal and environmental consequences of continued global warming.

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