

9-5-2006

## **Petroleum Geologist's award to novelist Crichton is inappropriate**

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### **Recommended Citation**

Brigham-Grete, J., Anderson, S., Clague, J., Cole, J., Doran, P., Gillespie, A., Grimm, E., Guccione, P., Hijghen, K., Jackson, S., Jull, T., Leavitt, S., Mandel, R., Ortiz, J., Rodbell, D., Schweger, C., Smith, A., & Styles, B. (2006). Petroleum Geologist's award to novelist Crichton is inappropriate. *Eos*, 87 (36), 364.  
<https://doi.org/10.1029/2006eo360008>

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Bias correction of QPFs is almost universally required for useful incorporation into hydrologic models. This facet of hydrological prediction requires development of model climatologies that can be compared against observed precipitation climatologies. Feature-based (or object-based) verification methods may have important applications to bias correction, which may serve to better define the character (timing, frequency, duration, intensity, and spatial extent) of precipitation, meeting participants agreed.

#### Recommendations for Collaborative Progress

While the symposium did not hold a plenary session in which formal recommendations were identified, several themes and recommendations surfaced repeatedly throughout the conference. These themes either transcend hydrological and meteorological subdisciplines or are applicable to improving the linkage between the atmospheric and hydrological components of the forecasting process.

Perhaps one of the most striking observations made at the symposium was the large difference, in terms of terminology and forecast evaluation criteria, that persists between the hydrological and meteorological forecast communities. On the basis of this dichotomy, it is apparent that work still remains on developing a common language for communicating processes, phenomena, and scales of interest between the hydrologi-

cal and atmospheric science communities, particularly with respect to ensemble and uncertainty terminology.

Uncertainty, and its quantification through the forecast system, must be addressed as a joint atmospheric-hydrological community effort. Both atmospheric and hydrological observations are fraught with measurement errors that propagate, and often grow, through modeling systems and contribute a significant source of uncertainty. Techniques that quantify measurement and process-related uncertainties and track the growth of these errors through physically based modeling systems are needed to better quantify the confidence of many hydrometeorological forecast products.

To facilitate collaboration between the two communities, meeting participants agreed that multiyear, regional-scale, integrated hydro-meteorological observing networks must be developed in order to advance coupled prediction systems capable of improving predictions across numerous spatial and temporal scales. These enhanced observing systems are required not only for improved understanding of coupled hydrometeorological processes but also for improving the calibration of numerical forecast models in heteroscedastic (nonconstant variance) regimes associated with climate variability, and for rigorous model validation. National and international continental-scale experiments, while having contributed much to process understanding during limited-duration field campaigns, have typically fallen short with respect to improved

understanding of multiscale interactions between the land surface and the atmosphere.

Furthermore, attendees also stressed that the measure of improvement of new efforts in precipitation and hydrological prediction must involve diagnostic, scale-dependent verification approaches. From the atmospheric modeling perspective, feature-based approaches have emerged as a general method to assess the quality of forecasts containing multiscale information. Multiscale verification of precipitation forecasts should be mapped onto networks of nested hillslopes and catchment features, to distinguish time and space scales exhibiting forecast skill from those scales which behave more randomly.

The WWRP Second Symposium on Quantitative Precipitation Forecasting and Hydrology was held at the University of Colorado in Boulder from 5–8 June 2006. The presentations from the symposium along with all posters are posted on the conference Web site at <http://www.mmm.ucar.edu/events/qp06/>. The next symposium is expected to be held in 2010 in a location yet to be determined. Interested parties should contact members of the WWRP steering committee through the WWRP Web site ([http://www.wmo.int/web/arep/wwrp/wwrp\\_homepage.shtml](http://www.wmo.int/web/arep/wwrp/wwrp_homepage.shtml)) with their suggestions and proposals.

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## FORUM

### Petroleum Geologists' Award to Novelist Crichton Is Inappropriate

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The American Association of Petroleum Geologists (AAPG) announced in February that the group had given novelist Michael Crichton its 2006 Journalism Award for his novels *Jurassic Park* and *State of Fear*. AAPG states that the Journalism Award is intended to acknowledge those who have contributed to the public understanding of geology.

The Council of the American Quaternary Association (AMQUA), a professional organization of scientists who study the recent (Quaternary) period of geologic time in which mankind has flourished, feels it was inappropriate for AAPG to give a journalism award for *State of Fear* for two reasons. The novel is not journalism. Furthermore, it is fiction that presents a distorted view of global warming as a scientific hoax, and Crichton is using his prominence as a novelist and movie director to push his views into the scientific debate on global warming and its consequences.

AMQUA's main concerns are that Crichton has blurred the line between fiction writer and scientific expert, using his novel as a springboard to influence public policy, and that AAPG seems to approve of both his message and his approach.

*State of Fear* is mostly a blend of Scooby-Doo and The Lone Ranger, an extended chase scene in which a small team led by an intrepid government agent foils a plot of evil environmentalists to engineer artificial 'natural' disasters in order to promote their cause. Crichton drives the action with the contention that global warming is a hoax. He essentially accuses the entire community of researchers involved in climate change, including those of us in AMQUA, of shading our findings on global warming in order to obtain the government grants that support our research. In a work of fiction, this would be fine—Crichton is free to spin his tale as he pleases. But it really does stretch the imagination to argue that scientists, a disor-

ganized and argumentative lot, somehow were able to orchestrate a vast conspiracy of fraud without blowing the whistle on each other.

Back in reality, U.S. Senator James Inhofe (R-Okla.), failing to distinguish between fiction and fact but clearly resonating with Crichton's maverick views on global warming, invited the author to testify before the U.S. Senate Environment and Public Works Committee. There, Crichton's main message (<http://www.crichton-official.com/speeches/index.html>) was that the methodology used in Earth sciences is suspect, and should be changed—maybe with governmental oversight—before global warming can be taken seriously.

Now that Crichton has inserted himself, and his fiction, into the public debate over climate change policy, his views, whether cast in the novel or in his personal statements, need to be challenged. In *State of Fear*, Crichton appears to be cherry-picking facts from an evolving scientific literature to show that warming is not occurring everywhere on the planet, and then arguing that this means that global warming is not occurring anywhere. In reality, the available scientific evidence clearly shows that the Earth on average is becoming warmer. Moreover, it is true that scientific evidence also shows that with this warming, change is not equal everywhere.

In his novel, Crichton's factoids are presented in the guise of a legal showdown in which the point is winning a case instead of understanding a situation. We believe that the AAPG should recognize the difference between scientific facts and debate, and the legal wrangling presented in the book. In our view, it was misleading for Crichton to present himself to the U.S. Senate as an expert witness. We have seen from encounters with the public how the political use of *State of Fear* has changed public perception of scientists, especially researchers in global warming, toward suspicion and hostility. Perhaps this furthered Sen. Inhofe's political agenda, but we do not believe AAPG should condone such behavior.

Crichton uses lulls in the action in *State of Fear* to insert editorial views more far reaching than his views on global warming. His core commentary is that the public is being manipulated through the media by fear—fear of the Russians during the Cold War, and fear of environmental catastrophe now that the Cold War is over. Scientists who study global warming and find it real are just caught up in this web. Oddly, public debate over *State of Fear* appears to have focused only on the 'bad science' charges against those who study global warming.

In honoring Crichton, we believe AAPG is lending its stamp of approval not only to Crichton's misrepresentation of global warming and his negative view of scientists, but also to his effort to slip his editorial views on global warming 'under the radar screen,' to

present them to the public, President George W. Bush in 2005, and even to the U.S. Congress without suffering the indignity of review by those who have actually conducted research on climate. On its Web site ([http://dpa.aapg.org/gac/papers/climate\\_change.cfm](http://dpa.aapg.org/gac/papers/climate_change.cfm)), AAPG aligns itself with Crichton's views, and stands alone among scientific societies in its denial of human-induced effects on global warming.

Few credible scientists now doubt that humans have influenced the documented rise in global temperatures since the Industrial Revolution. The first government-led U.S. Climate Change Science Program synthesis and assessment report supports the growing body of evidence that warming of the atmosphere, especially over the past 50 years, is directly impacted by human activity [Karl *et al.*, 2006].

Crichton and his supporters at AAPG appear to prefer his fictional account to peer-reviewed scientific inquiry. As AAPG Communications Director Larry Nation famously said, "It is fiction, but it has the absolute ring of truth." Yet, the foundation of science is the belief that truth is not defined on the basis of support for a desired political outcome. It is hard to understand why AAPG would honor this endeavor and thereby dishonor those scientists diligently working to understand rapid change in the making and communicate the environmental consequences.

In bestowing its 2006 Journalism Award on Crichton, AAPG has crossed the line from scientific professionalism to political advo-

cacy. In our opinion, the group should be upfront about its new status.

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*This article is presented by the Council of the American Quaternary Association. More information about AMQUA is available at <http://www.amqua.org>*

## ABOUT AGU

### AGU Scientists Testify at Climate Change Hearing

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AGU recently helped the U.S. House of Representatives Committee on Government Reform to organize the hearing by suggesting potential witnesses and outlining potential topics to explore, such as the global carbon cycle, rapid climate change, climate feedback processes, and satellite measurements. Climate change falls within the committee's broader interest in the federal government's programs on energy and resources. Four AGU members testified at a 20 July hearing.

In his opening statement, Committee Chair Rep. Tom Davis (R-Va.) said, "We are here today to acknowledge that too many elected officials have for too long been MIA [missing in action] on this issue. We hope to begin changing that. But first we need to step back and ask some basic but critical questions. Exactly what is climate change, and where are we with the science?"

Committee Ranking Member Rep. Henry Waxman (D-Calif.), in his opening statement, decried a hearing held the day before by the

House Energy and Commerce Subcommittee on Oversight and Investigations, which focused on the 'hockey stick' graph of temperature over the past millennium (which shows that temperatures in the twentieth century rose significantly like the blade of a hockey stick) that had appeared in two papers published in 1998 and 1999 by Michael Mann (Pennsylvania State University) and colleagues. Waxman described the hockey stick hearing as "not a real, legitimate hearing" and vowed to focus on science during the Government Reform Committee hearing.

The committee first heard from James Connaughton, chairman of the White House Council on Environmental Quality, who presented an accounting of the Bush Administration's climate policy, citing its emphasis on technological innovation and on achieving a reduction in "greenhouse gas intensity" (emissions per unit of gross domestic product). Connaughton also noted the recent increase in the gas mileage standards for light trucks and sport utility vehicles, and reiterated the Bush Administration view that

the Kyoto Protocol to the United Nations Framework Convention on Climate Change "set impossible targets" for emission reductions. Connaughton spent much of the question and answer period defending the Administration's climate policy under sharp questioning by Democrats on the committee.

AGU member Thomas Karl, director of the U.S. National Oceanic and Atmospheric Administration's National Climatic Data Center, wrote in his testimony that "there is convincing evidence from a variety of climate change detection and attribution studies pointing to human influences on climate." Karl emphasized that human-induced changes in atmospheric composition are the primary human influence on modern climate change, while noting that there is considerable uncertainty about rates of change that can be expected.

AGU members John Christy (University of Alabama, Huntsville), Judith Curry (Georgia Institute of Technology), and Jay Gulledge (Pew Center on Global Climate Change) testified in a second panel that also included Roger Pielke, Jr. (University of Colorado). The scientists agreed that human-induced climate change is real, while each presented differing views on the details and magnitude of its impact. Pielke spoke of moving beyond the science and focusing on mitigation and adaptation, stating that the issue will be with us for decades or longer.