


ON THE WEB: PUTTING EARTH'S HISTORY IN ORDER

About 13 years ago, paleontologist Doug Erwin of the Smithsonian Institution in Washington, D.C., and geochronologist Sam Bowring of MIT in Cambridge, Mass., were flying home after fieldwork in China when they had an idea: What if all the scientists who researched Earth's history got together to date rocks with the highest possible precision? After all, geochronology — the study of dating rocks and events in Earth's history — had come such a long way since it had first been practiced in the late 19th century. Radioisotope dating techniques could now place volcanic rock layers at plus or minus 0.1 percent of their age. Yet despite these improvements, differences between labs and methodologies were often larger, making it more difficult to tell what led to what in the history of life.

ON THE WEB:  
WWW.EARTH-TIME.ORG

The EARTHTIME Web site has a little something for everyone interested in geochronology. For geochronologists, it offers everything from job postings to open forum discussions on various dating techniques to projects and ways to get involved. For everyone else, the education section would probably be most helpful, offering information and teaching modules on geochronology for K-12 students, college students and specialists. 

To put everyone on the same page, Erwin and Bowring organized a meeting at the Smithsonian to bring together stratigraphers (scientists who study the order of rock layers), paleontologists and geochronologists. By the end of the meeting, the EARTHTIME project was born. A major part of EARTHTIME has included standardizing geochronological methods. Prior to EARTHTIME, labs had set their timelines according to their own tracers (isotopic mixtures with known ratios)

Trilobites — arthropods like lobsters and insects — had existed for 280 million years (twice as long as dinosaurs) before being wiped out during the Permian-Triassic extinction 252 million years ago. Now the EARTHTIME project may help answer what caused their demise.

and standards (minerals of known ages), making results between labs less comparable. Through EARTHTIME, a group at MIT and the National Environmental Research Council in Keyworth, England, created and distributed a universal set of standards and tracers to willing and able laboratories. With this new tool in hand, paleontologists, stratigraphers and other scientists can better address some of the planet's biggest questions. Recently, EARTH contributor Brian Fisher Johnson chatted with Erwin and Bowring about how EARTHTIME began and how it might explain the greatest mass extinction of all time.

**BFJ: How did the scientific community respond to the EARTHTIME project?**

**SB:** Our very first EARTHTIME meeting in Washington was like a therapy session.

**DE:** Starring Sam as the psychiatrist.

**SB:** The paleontologists and the stratigraphers would say, "We would like to do geochronology, but I sent samples to so-and-so five years ago and we're still waiting for an answer." And the geochronologists would say, "Yeah, but the samples you sent were crap." By the end, we gained a vast appreciation for one another's perspective and it led to many collaborations and publications just from that one meeting.

**BFJ: One of your research interests includes the Permian-Triassic mass extinction about 252 million years ago, an extinction that killed more than 90 percent of marine life, about 70 percent of terrestrial life, and preceded the beginning of the dinosaurs. Has EARTHTIME solved any longstanding questions about its cause?**

**DE:** The original idea was that the formation of the Pangaea supercontinent caused the extinction by homogenizing life. Imagine three continents each with a species of lion. If the three continents collide to form one, there may only be room for a single species of lion — resulting in a net loss of two species. The formation of Pangaea happened over tens

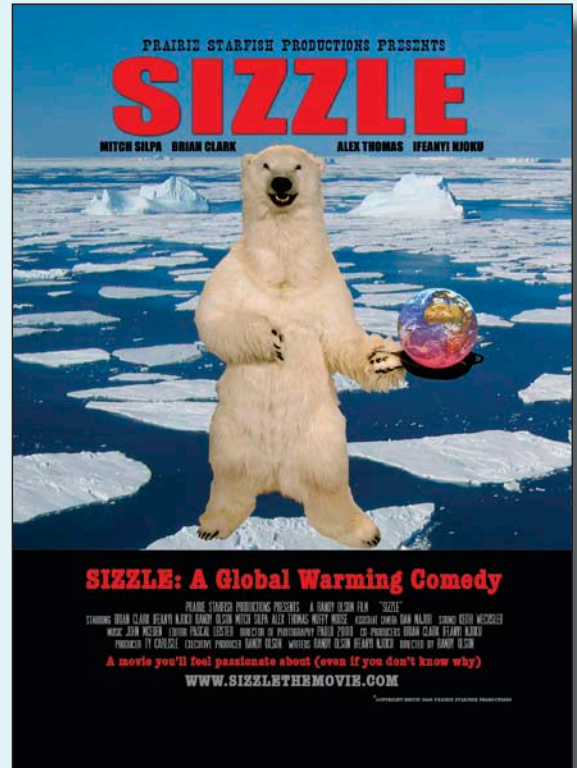


**MOVIES: "SIZZLE" SIZZLES WITH HUMOR**

Scientists usually publicize their research results by writing jargon-filled papers for technical journals and presenting data-packed PowerPoint slides in stuffy, dimly lit seminar rooms. However, that type of communication doesn't fly with the general public. So goes the message of "Sizzle: A Global Warming Comedy," a fresh, funny and entertaining "mockumentary" directed by former marine biologist Randy Olson (the man who brought us the evolution-based "Flock of Dodos" in 2006). The film tackles climate change with a hefty dose of humor, making it a refreshing break from the seemingly ubiquitous footage of melting glaciers and stranded polar bears.

"Sizzle" follows a film team through the process of making a global warming documentary. Olson plays a scientist-turned-filmmaker who is constantly butting heads with his crew. He wants to interview scientists, but his flashy Hollywood producers suggest actor Tom Cruise because he is a Scientologist and "a lot of people don't know the difference." Olson's idea to name the film "The Heat Is On?" is greeted with yawns from the rest of the team who instead get excited about such titles as "Emission Impossible" and "To Live and Fry in L.A."

That's just the beginning. The climate data PowerPoint presentation that Olson wants as the documentary's cornerstone makes his Hummer-driving cameraman, who thinks global warming is a scam, feel like he "was in jail again." And Olson's interviews with a number of prominent climate skeptics, such as William Gray of Colorado State University in Fort Collins, engage the cameraman more than the interviews with some of the world's renowned climate scientists, including Richard Somerville of the Scripps Institution of Oceanography in La Jolla, Calif. At one point, the producers even decide to ditch the documentary in favor of one about skin rashes, because rashes are a problem that "is actually hurting a lot of people right now." Eventually science historian Naomi Oreskes of the University of California at San Diego suggests a trip to New Orleans, where the chilling accounts of a group of Hurricane Katrina survivors convince everyone that global warming is real and serious.



In the end, "Sizzle" shows that explanations of atmospheric carbon dioxide concentrations and climate feedback loops are unlikely to engage public concern about global warming. Real-life evidence has the best — if not the only — chance of doing that. Olson's choice of New Orleans' devastation as that real-life example is reasonable — even though any scientific link between intensified hurricanes and global warming is tenuous at best. "New Orleans is the only place in America right now where you can really see what the future holds in store for us if we don't do something about global warming," Oreskes says in the film. Well, perhaps those in Alaska would disagree. But whether you agree with the film's "science" or not, "Sizzle" is still a fun way to spend a couple of hours.

To see "Sizzle," visit the film's Web site at [www.sizzlethemovie.com](http://www.sizzlethemovie.com) for a list of scheduled screening locations.

**Nicole Branan**

of millions of years. But we established in 1998 that the extinction happened on the order of hundreds of thousands of years, probably much less than a million. What many of us are focusing on now is the extinction's association with the Siberian flood basalts, this massive volcanic eruption in Siberia.

**SB:** This is where EARTHTIME comes in. If you want to show there's a causal link between an eruption and an extinction, you have to show, for example, that they're the same age within plus or minus 50,000 years. We have the age

of the extinction as good as it's going to get. Now we're focusing on dating the Siberian flood basalts. It is going to require multiple labs using multiple techniques getting the same answers. A number of labs are working on this problem, and through the EARTHTIME approach, we can solve this problem much faster.

**BFJ: Anything you'd like to emphasize about EARTHTIME?**

**SB:** EARTHTIME is not just about doing the science. It's about developing the tools that enable the science to be

done, and in order to do that, we have to get everyone on the same high level of operation.

**DE:** The EARTHTIME project isn't about the things Sam and Doug happen to be interested in. It's about reopening new opportunities just like the Human Genome Project did. If we can produce a geological timescale at the resolution Sam has been talking about, then we can ask a whole new set of questions — about the history of life, about evolution, about climate change — that we can't ask today. 