Geophysicist finds teaching opportunities in movie mistakes

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Few scientists regard the 1997 movie Volcano, in which flaming magma suddenly spews from the La Brea tar pits and incinerates much of Los Angeles, as a means to foster scientific literacy. After all, Southern California has no magma to spew. But geophysicist Seth Stein sees it differently.

"Scientists have a choice," said Stein, William Deering Professor in the Department of Earth & Planetary Sciences at Northwestern University. "We can complain about all the horrible mistakes that are in a lot of movies, or we can say, "hey, this is a really great opportunity to get the class interested.'"

Stein argues that scientific errors in movies, from impossibly large tsunamis to caverns in Earth's mantle, can be used to teach scientific lessons and foster a healthy sense of skepticism. By training students to spot the errors and seek out true explanations, Stein often incorporates scientifically disastrous disaster movies into his classroom lessons on tectonics, Earth's interior, and geo-physical data analysis.

Stein and his coauthors, geologists Reece Elling, Amir Salaree, and geophysicist Michael Wysession of Washington University, plan to share their approach at the Geological Society of America's Annual Meeting on Monday, 23 October, in Seattle, Washington.

There's no shortage of scientific unlikelihood to choose from. In the 2003 movie The Core, for example, a team of "terranauts" venture into

Earth's core inside a vessel made of "unobtanium," where they encounter gaping voids in our planet's interior and crash through fields of sparkling, jagged minerals. The 2004 television miniseries "10.5" portrays destruction brought on by an earthquake of an absurdly large magnitude.

By identifying these errors and learning why they're inaccurate (caverns and the minerals shown simply couldn't exist at those depths and pressures, nor would an M10.5 earthquake strike our planet), Stein said he offers students an entertaining way to connect with their inner skeptic: a vital trait for young scientists in training.

"Scientists are supposed to be skeptical," said Stein. "We're not supposed to believe what authorities tell us. We're supposed to question and challenge everything."

Stein said the errors extend beyond film. He's spotted inaccuracies in widely-used educational software, science museum animations, popular geology textbooks, and even drafting errors in his own books.

Among the most pervasive movie errors, Stein said, is the ubiquitous "lack of geological constraints on the world," and that "you can just have volcanoes popping up everywhere." It looks as if Stein will receive more teaching opportunities just before GSA 2017, as the new movie Geostorm, in which a weather-controlling satellite system turns nefarious, instantly freezing an entire Afghani village and unleashing packs of tornadoes on unsuspecting civilians, comes out 20 October.

Yet Stein's presentation comes at a time when movie and television crews often hire scientists as consultants, who do everything from writing equations on background classroom boards to reviewing scripts for gross scientific inaccuracies. Stein refers to The Martian, whose production was thoroughly informed by NASA specialists, as one of the

more accurate films of late.

"There was only one thing they had to fudge," said Stein, "which was the initial scene where the mission was destroyed by the wind storm. It's true that the wind speeds on Mars are very high, but because the density of the atmosphere is so low it wouldn't actually matter."

More information: gsa.confex.com/gsa/2017AM/meet … app.cgi/Paper/303706

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