An Asteroid Scientist’s Perspective on how the Media has Handled NEOs Over the Years

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80 Years Ago...

- Only four Near Earth Asteroids had been discovered by 1931
- So there had been almost no thinking about the impact threat
- This report of “meteors” exploding in the Brazilian jungle, burning down vast regions, cannot be confirmed
- But such an event is certainly possible, like Tunguska in 1908
- Treatment in this British newspaper was certainly sensational
  - “menace”, “huge bombs”, “hurricane of flame”, “blazing bolts”

There were ancient fears of comets
Big Asteroid Passes Near Earth Unseen In a Rare Close Call

By WARREN E. LEARY, Special to the New York Times
Published April 20, 1989

In cosmic terms, it was a close call.

A large asteroid capable of wreaking widespread damage if it collided with Earth passed within half a million miles last month, the closest approach of such an object in 50 years, astronomers said today.

The asteroid, a collection of rock and dust half a mile or more in diameter, crossed Earth's orbit undetected March 23 at a distance equal to twice that between Earth and the Moon. Object Will Return

Scientists later calculated that the asteroid, traveling at 46,000 miles an hour, is orbiting the Sun once a year on an elliptical path that regularly brings it back toward Earth.

"It can come this close or closer in the future," said Dr. Henry Holt, the Northern Arizona University astrogeologist and astronomer who discovered the object in photographs taken March 31 using the 18-inch Schmidt telescope at the Mount Palomar Observatory in California. "We'd like to know more about it and when it's coming."

"The passage of 1989FC was the closest to Earth since 1937."
Multi-hundred meter NEO passed Earth at 0.84 lunar distance last Tuesday p.m.

“aircraft carrier-sized asteroid” [400m]
- in length, possibly, but masses of aircraft carriers are 100x less
- actual astronomical data aren’t formally published, inconsistent; probably it is <300 m diameter [preliminary results: ~300 m]
- “4000 megaton,” “mag. 7 quake”: well, less than that...but experts’ mistake

“within 0.8 lunar distances” [0.84]

“closest approach [of an NEO] this size in over 30 years”
- but 1976 NEO wasn’t known then
- and many NEOs this size aren’t yet known today

Next time: “2028... 0.6 lunar dist.”

“it will be a daylight object until... November 8.”
- “daylight object” can mean “so bright you can see it in the daytime”: no way!
Scientists Read a News Item Critically...as Though it were a Scientific Paper

(Not that they should, but they do...and I do, too)

- **Minor Mistakes:** names, dates, numbers inexact
- **More Serious:** fundamental facts wrong, important caveats missing
- **Most Egregious:** the main story is highly misleading, greatly exaggerated, or just plain bogus

**Sources of error:**

- scientists screw up, have agendas, communicate poorly
- reporters are untrained, hastily on deadline, or sloppy
- fewer science journalists, more weathercasters
- pressures to sensationalize
- improper, biased, erroneous institutional press releases
- 24/7: failures to place specifics into the broader context
- cheap, simplified graphics mislead or are wrong
- headlines or sound-bites misrepresent the larger story
- reporters may go to highly biased or quack sources
- readers/viewers lack scientific literacy (uneducated), so they misinterpret implications of even accurate stories
- nature teaches us, so the science changes, too rapidly
- media-to-media serial accumulation of mistakes
Serial Mistakes (?) by the Media

- Professional talk by Chapman & Morrison at AGU meeting in 1989
- An OK Assoc. Press story
- Picked up by New China News Agency, broadcast as leading story on Chinese evening television newscast, saying asteroid will strike China next week
  - reportedly, crying women carry their babies into the streets
- *N.Y. Times* reports theory by U.S. foreign policy experts that this is NOT a mistake but a policy decision by the Chinese government to provide a reason for China to retain its nuclear missiles

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**Geophysicists suggest steps Earth can take to reduce disastrous tolls of natural hazards**

By Lee Siegel
The Associated Press

SAN FRANCISCO — Earth is raked by quakes, floods, slides, storms and volcanoes — not to mention an occasional 100,000-megaton whack from an asteroid. But sitting ducks can fight back, geophysicists say. As the American Geophysical Union ended its five-day fall meeting Friday, suggestions for reducing death and destruction from natural hazards included requiring tornado shelters in mobile-home parks, planning land use to avoid quake and slide damage, and steering incoming asteroids away from Earth.

An asteroid two-thirds of a mile wide hits Earth about every 300,000 years, and today it could kill more than half Earth’s population because of climate and direct effects of a blast equal to 7.7 million Hiroshimized atomic bombs, said Clark Chapman of the Planetary Science Institute in Tucson and David Morrison of the National Aeronautics and Space Administration’s Ames Research Center in Mountain View, Calif.

Conservatively assuming a 30-year human lifespan, that means any person has about a 1-in-6,000 chance of being killed by an asteroid during his or her lifetime, compared with an American’s 1-in-20,000 chance of dying on a plane crash or 1-in-50,000 chance of being killed by a tornado, said the pair, who wrote the book “Cosmic Catastrophes.”

“This is, in fact, a real hazard,” Chapman said. “We’re in a shooting gallery.”

Even a small asteroid impact “could be mistaken for a nuclear attack,” he said. “It might trigger a nuclear attack.”

One asteroid passed within 500,000 miles of Earth this year, about twice the moon’s distance, and a small one devastated an uninhabited part of Siberia in 1908. So it makes sense for society to better evaluate likely consequences of a collision and use telescopes to provide years’ notice of incoming asteroids, Chapman said.

“Just 2 months after Loma Prieta earthquake...”

“...and hydrogen bombs, although bombs might break an asteroid into more deadly fragments, he said. “It would be an Apollo-project level of expense.”

Most scientists discussed more common natural disasters during Friday’s session.

“It’s absolutely imperative we insist mobile-home parks have secure underground shelters” in tornado and hurricane-prone regions, said Joseph Golden, senior meteorologist for the National Oceanic and Atmospheric Administration.

Golden said home designers need to pay more attention to wind-resistant cladding for buildings, and build homes with interior closets and bathrooms, which often are the only parts of a house left standing after a bad hurricane.

Better effort also is needed to predict hurricane tracks and intensities, and to learn if building codes are adequate for typical wind speeds, he added.

Robert Tilling, a U.S. Geological Survey volcanologist, said 25,000 people died during the Nevada del Ruiz volcano eruption in Colombia in 1985 because local officials ignored hazard maps, signs of impending eruption and formal warnings by scientists.

He called for better communication between scientists and officials, increased monitoring of volcanoes that now go unwatched in developing nations, and improvements in predicting volcanic activity.

Earl Brabb, a Geological Survey geologist, said it is “a national disgrace” that there is a lack of aerial photographs to identify areas prone to deadly landslides, which cause tens of billions of dollars damage globally each year.

Geological Survey seismologist William Ellsworth said researchers are getting better at making long-term forecasts of which segments of faults are prone to destructive quakes.

He said emergency officials believe public safety during the deadly Oct. 17 San Francisco Bay area quake was improved because people made preparations after scientists warned in 1988 that the San Andreas Fault was due for a jolt near the bay’s south end.
Scientists Read a News Item Critically ... as Though it were a Scientific Paper

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- media-to-media serial accumulation of mistakes
2008 TC3 & Short-Term Warnings

- 2008 TC3 was the first Near Earth Asteroid ever discovered (Catalina Sky Survey, 7 Oct. 2008) that was then predicted, for sure, to strike the Earth. It was then observed telescopically before it hit.

- 20 hours after discovery, the predicted impact occurred and was recorded, and hundreds of resulting meteorites were later collected on the ground (in a Sudan desert near Egypt’s border).

- This kind of event was thought to be impossible, but it was not a fluke: we must expect future predictions of small NEO strikes, even from the existing Spaceguard Survey, without waiting for the “next generation” surveys.

- The most likely warning of an actual hazardous NEO impact will be one of these “final plungers,” providing hours to weeks of warning.

- Evacuation, not NEO deflection, will be the most likely kind of “mitigation” we need to plan for.

But the event taught us that we have much to learn: Conventional wisdom had said that TC3-like events weren’t possible!
Short-Term Warnings: Spaceguard Survey does Better than We Thought!

- Was it a miracle that telescopes saw what was plausibly the largest NEA to impact Earth in 2008? No! Capability to see “final plungers” was overlooked.
- Analyses in the 1990s of the “Spaceguard Survey” only considered cataloging of Near-Earth Asteroids; short-term warning was evaluated only for rare comets.
- So it was thought that there was only a tiny chance that a dangerous in-bound 30-m NEO would be seen, let alone a 3-m “TC3”.
- The short-term hazard warning was evaluated (NASA SDT 2003) for the “next generation” surveys, but not for small NEOs and meteorite recovery.

“Consider a 30–40-m office-building-sized object striking at 100 times the speed of a jetliner…. Even with the proposed augmented Spaceguard Survey, it is unlikely that such a small object would be discovered in advance; impact would occur without warning.” – C. Chapman, EPSL (2004).

“a short lead time for an NEO is extremely unlikely – we can expect either decades of warning or none at all” – Morrison, Harris, Sommer, Chapman & Carusi (“Asteroids III” 2002)
Scientist’s Jargon and Non-Intuitive Concepts

- “virtual impactors”
- “keyholes”
- Very tiny probabilities (1-in-ten-million)
- Huge consequences (10,000 megatons)
- “Rocket science”
- Uncertainties and “error bars”
- Asteroids orbit the Sun, don’t head “straight toward” Earth

Conclusions from a Single Simulation (statistics of one...)

A 140 m sized, coherent NEA could be deflected via a 1160 kg kinetic impactor striking the NEA in 2023 (ΔV ~ 4 km/s) - some 21 years in advance of the threatening Earth encounter in 2049.

- 4.00 mm/s ΔV in 2038 produces asteroid deflection of 80,000 km in 2049 (all is well) but 4.69 mm/s ΔV in 2028 drops asteroid into 6.5 keyhole for an impact in 2054 (oops...)

- The 6.5 keyhole in 2049 is only 6 km wide and the 6 others are also narrow so the likelihood of a keyhole passage in 2049-2074 is only ~0.02% but due to fairly large uncertainties in the asteroid's 2049 ephemeris positions (~200 km), the likelihood of having to worry about a keyhole passage is ~100 times larger.

- In our case, 2028 knowledge of actual keyhole passage in 2049 is ~1%

- Because of intervening approaches to Earth and Venus, the dynamics are very non-linear and the optimal time for tracting is not right after the realization that the kinetic energy impact dropped the asteroid into a 6.5 resonant return keyhole. The optimal time for tracting is ~2036 when 200 days of tracting provides ~1500 km motion on the 2046 impact plane – more than enough to ensure the NEAs 5 uncertainty ellipse is moved off the relatively tiny keyhole. Each impact case is likely to be very different.

- In 200 days of tracting, the asteroid's uncertainty region (3.6 sigma) is moved completely off the 2049 keyhole.

Variable Specific Impulse Magnetoplasmadjet Rocket Concept

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<th>IMPACT ENERGY</th>
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<td>&gt;3 m</td>
<td>2 KT</td>
<td>2 per year</td>
<td>Blinding flash, could be mistaken for atomic bomb</td>
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A Tiny Chance of an Asteroid Strike in the Distant Future

Survey: 7 new asteroids could threaten Earth

July 31, 1997
Web posted at: 2:32 p.m. EDT (1332 GMT)

BOSTON (CNN) -- Seven previously unknown asteroids that are close enough and large enough to threaten the Earth have been found by astronomers scanning the heavens for potentially dangerous space rocks.

Asteroid may crash into Earth -- in 2880

DALLAS MORNING NEWS

A large asteroid has up to a 1-in-100 chance of hitting Earth in the year 2880, astronomers say today.

But future observations could reduce uncertainties about the asteroid's path, possibly bringing the odds of a collision to zero.

"It's not something to worry about because it's so far in the future," said engineer Jon Giorgini, lead author of the study that appears today in the journal Science. "Eight hundred and seventy-eight years -- that's 35 generations from now."

Steven Chesley, an asteroid expert at NASA's Jet Propulsion Laboratory in Pasadena, Calif., said he is sure that the asteroid will never actually make it to Earth.

A report posted on the Web cites a one-in-a-billion chance that the asteroid could hit the Earth in 2039.

Scientists say asteroid may tango with Earth

By David L. Chandler GLOBE STAFF

In a discovery eerily reminiscent of one made just a year ago, astronomers have found an asteroid that will come close quite soon to Earth in a few decades, and that even has a real but mildest chance of hitting it.

Asteroid is expected to make a pass close to Earth in 2028

By MALCOLM W. BROWNE

An asteroid is likely to pass within 20,000 miles of Earth on Oct. 26, 2028, a Thursday, and there is a very slight possibility that it might hit Earth, the international astronomical community that tallies the orbits of asteroids and comets wrote in an essay yesterday.

Dr. Brian G. Marsden, director of the Central Bureau for Astronomical Telegrams at the Smithsonian Astrophysical Observatory, Cambridge, Mass., cautioned in an interview that calculations of the asteroid's progress are approximate and that there is no immediate cause for alarm.

It is impossible to calculate the odds of an impact, Dr. Marsden said. But he appealed to astronomers with large telescopes to measure the asteroid's brightness and size, estimated to be as large as a mile in diameter and to refine measurements of its orbit.

There is ample evidence that Earth has been frequently bombarded by asteroids and comets, some of which may have contributed to mass extinctions.

Many scientists say they believe that the impact of an asteroid or comet about six miles in diameter on the coast of the Yucatan Peninsula 65 million years ago (releasing some 3 billion times more destructive energy than the atomic bomb that leveled Hiroshima) contributed to the extinction of the dinosaurs.

The impact of an asteroid one mile in diameter would have devastating global effects, including tidal waves, continent-size fires and an eruption of dust that could cause global cooling and long-term disruptions of agriculture. But Dr. Marsden said such an asteroid impact would not necessarily be severe enough to wipe out the human race.

The scale of devastation could be gauged from the effects of a more recent impact. On June 30, 1908, a tiny meteorite hit near the Tunguska River in Siberia. That object, later estimated as less than 100 yards across, exploded six miles above Earth. It flattened trees over nearly 800 square miles, ignited forest fires, and caused damage equivalent to that of a 15-megaton hydrogen bomb.

Asteroid 1997 XF11, as the current object is named, was discovered on Dec. 6 by Dr. James V. Scotti of the University of Arizona. Scientists use a 36-inch-diameter telescope equipped with special instruments atop Kitt Peak, Ariz., to maintain a watch for all small objects in the solar system, especially asteroids and comets that approach Earth at dangerously close distances.

Two Japanese amateur astronomers later noticed the object, and on the strength of the combined measurements, the asteroid was added to a list of 168 known "potentially hazardous objects," or "P.H.O.s."

Thereafter, astronomers in several countries refined measurements of the object and concluded that the asteroid would come particularly close to Earth in 2028. Their estimate was that it would

Continued on Page A15
Asteroids Found After Their “Near Misses” with Earth

Just as likely to see them going as coming...most likely not to see them at all!

These typical stories are explicitly or implicitly critical of the NEO surveys

They say there is a “blind spot”

But whether discovered before or after a close passage, an NEA is unlikely to actually strike Earth for decades or centuries

“Peiser, a European scientist”: Just who is he?
The Odd Career of Benny Peiser

- A non-scientist (historian of ancient sports), he began in 1997 to comment on asteroid threats in an on-line newsletter (CCNet).
- He became a prime source for journalists about impending asteroid impacts.
- He was regularly quoted as an NEO “expert” by the media, when he actually badly misunderstood the science.
- An argumentative guy, he often seemed to be trying to stage fights between people.
- Half-a-dozen years ago, he stopped covering NEOs and has become a prominent and controversial denier of climate change and global warming.

Benny J. Peiser:

Was:
Senior Lecturer in the School of Sport and Exercise Sciences, Liverpool John Moores Univ.

Now:
Director of “Global Warming Policy Foundation”
Comet Swift-Tuttle: Never was a Problem...

- MPC Director Brian Marsden did a faulty back-of-the-envelope calculation while talking with science reporter David Chandler...
3/11/98 Brian Marsden issued a Minor Planet Center “PIS” (Press Information Sheet) implying this 1 – 2 km NEA had a 1-in-1000 chance of striking Earth on 26 Oct. 2028.

Correct data analysis would have showed chances were <10⁻⁴². “That’s zero, folks!”
The Torino Scale: NEO Scientists Attempt to Communicate Risk

The Torino Scale
Assessing Asteroid and Comet Impact Hazard Predictions in the 21st Century

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Diagram scientists use to determine value in particular case

Many journalists actually used this scale. Introduction of the “Palermo Scale” confused things. Homeland Security turned scales into a joke.
Sometimes, Difficult to Distinguish Between Supermarket Tabloids and Mainstream Media

- Clipping below is from an actual supermarket tabloid (perhaps the “National Enquirer”)
- Actually, content is OK…only the headline is **bogus**
- But the same bad headline actually repeated text from a piece written by a BBC science journalist [next slide]:

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**Killer asteroid heading straight for Earth**

SCIENTISTS ARE so fearful a deadly runaway asteroid will slam into the Earth and wipe out all life they’re seeking government support to nuke it.

They say even a “tiny” asteroid only a few miles wide could strike such a devastating blow that it would destroy the planet’s population.

“It’s a long shot, but we could take a hit,” says David Morrison, chief of the Space Science Division at NASA Ames Research Center in Mountain View, California.

The Galileo spacecraft recently photographed a potato-shaped asteroid called Gaspra from less than 1,000 miles away, in the first close encounter of its kind.

Gaspra is relatively small — about 6 miles wide and 11 miles long.

But experts warn that a doomsday rock of even this relatively small size could strike the Earth with such force that the resulting dust and debris tossed into the atmosphere would block out sunlight. And it would wipe out the Earth's people, just as the dinosaurs are now believed to have been wiped out by an asteroid striking the Earth 65 million years ago.

Keeping track of about 10,000 asteroids that have orbits approaching the Earth would require at least six $12 million telescopes distributed throughout North and South America, he says.

“With proper tracking techniques, astronomers could spot a potentially catastrophic one decades before it would hit the Earth,” says Morrison.

“The next step would be to go out and meet the meteor, deflecting it from its collision course with the planet.

“The simplest way, we think, is to set off a nuclear bomb next to it. Changing the asteroid’s speed by even one centimeter a second could avert catastrophe.”
“…on an impact course with Earth”: What does that Mean?

- This asteroid was NOT on a nominal collision path with Earth (in 2019)
- Indeed, its calculated chances of hitting Earth were < 1/100,000.
- Morrison and I criticized BBC science reporter David Whitehouse for these faulty words.
- Probably based on the BBC report, this non-event became headline news around the world.
- Whitehouse justified his words:
  - “It is pedantry to say that the probability of such an impact was so low that it is misleading to use the words ‘collision course’…”
  - “You are completely and utterly wrong in saying that because NT7 had a Torino scale of 1 it merited only minor concern by the news media.”
Journalism Awards Given for Egregious Treatment of NEOs

- **Annual European Online Journalism (EOJ) Awards:** In 2003, Dr. David Whitehouse, online science correspondent of the BBC, “won the best news story broken on the net...for his news story ‘Space Rock on Collision Course’ about the 2002 discovery of an asteroid which could hit the Earth in 2019.” [BBC, 4 Jul. 2003]

- In 2010, the American Association for the Advancement of Science (AAAS) presented its prestigious Kavli award for best TV documentary of the year to Doug Hamilton of “WGBH/NOVA” for an appalling show, “The Last Extinction,” in which NOVA paid for an expedition to Greenland by (pseudo-) scientists, who claimed to prove that a 4-km wide comet struck Earth just 13,000 years ago, a preposterous claim with no valid evidence.
  - The show was based on no paper published in the professional literature
  - A chief “scientist” involved apparently has no degree, and recently changed his name to avoid linkage with being found guilty of fraudulent practices in California
Fear-Mongering by the Respectable Press
(Orlando Sentinel, San Jose Mercury News)
The Asteroid Movies

- In 1994, a survey by Paul Slovic showed that ~25% of the public was aware of the potential danger from asteroids.

- Awareness climbed dramatically in 1998 when two blockbuster movies were being promoted, coincidentally just as the 1997 XF11 affair was in the headlines.

- “Deep Impact” hit the screens two months later. Scientists regarded it as a flawed but inoffensive portrayal of an asteroid impact.

- “Armageddon” (opened July 1998) was a totally dreadful movie about Bruce Willis trying to destroy an asteroid “as big as Texas.” This movie’s grotesquely distorted view of reality has shaped public impressions of NEO defense.

- “Armageddon” was nominated for 4 Oscars (including “Best Visual Effects”, which actually showed physically absurd attributes of the ‘Texas-sized’ asteroid).
Astronomers Give “Thumbs Down” to Asteroid Movies

Rocky horror picture shows

Astronomers are buzzing over the scientific accuracy of two summer movies, both fanciful accounts of outer-space objects that menace the Earth and various heroic measures taken to save it.

Deep Impact, from Paramount Pictures, DreamWorks L.L.C. and Amblin Entertainment, concerns a seven-mile-wide comet on a collision course with Earth. Through the intervention of a crew of astronauts who eventually sacrifice themselves, the planet is saved, despite severe damage when a small chunk of the comet falls into the sea.

Armageddon, from Touchstone Pictures, a Walt Disney production, seems to be going straight for Earth, with its billion-dollar, thrillers-convealed for the first time.

Despite the attention they have received, both movies are not scientifically accurate. In fact, the level of accuracy is such that the movies are more likely to cause panic among the public than to educate them about the real threat that asteroids pose to Earth.

Movie Myths vs. Scientific Reality

By Stephen P. Maran
Special to The Washington Post

Astronomers have never hit a landmark building as shown here in Armageddon, they have collided with Earth. (Touchstone Pictures)
Planetary Defense


Of course there is a good possibility of averting disaster: Search for a possible threatening NEO, then send a spacecraft mission to deflect it away from Earth.
NEOs, Politics, and Opinion

Last Wednesday

The New York Times

Killer Asteroids: The Perfect Peril

The nation's asteroid astronomers are eager to start tracking this new enemy. The NASA panel and hit with a force greater than 100,000 megatons.

Chicago Tribune June 5, 1990

Asteroid threat is real, Quayle says

WASHINGTON (Reuters)—Vice President Dan Quayle and some astronomers are worried that Americans are too complacent about the possibility of Earth being struck by a giant asteroid like the one blamed by some experts for snuffing out the dinosaurs 65 million years ago.

If the past is truly prologue, they say, an asteroid could come hurtling down at any moment, at any point on the globe.

If it were big and landed close enough to a large city, it could kill millions of people on contact and send up clouds of dust that could block the sun and make the world a cold and life-threatening place for generations, the experts say.

"It would certainly benefit all nations to know when such an event might occur, warn those who could be affected and maybe some day even affect whether or not an event might happen," Quayle said in a recent speech to the American Institute of Aeronautics and Astronauts.

Quayle is chairman of the National Space Council, which advises the president on U.S. space policy.

The Aeronautics Institute has been wrestling the government to set up a program to identify asteroids that threaten to crash into Earth and look for ways to push them off course.

"Despite the low probability that a life-destroying asteroid impact will occur, the fact is that the probability of such an event is finite and, should it occur, the resulting disaster is likely to be without precedent," the institute said in a report.

While no human has ever been killed by a falling asteroid, at least as far as scientists know, a dog was killed by one in Nakhil, Egypt, in 1906.

In March 1989, an asteroid bigger than an aircraft carrier and traveling at 46,000 miles an hour "just missed" the Earth, crossing its orbit just six hours before the planet reached the same point in space.

Jerry Grey, director of science and technology policy for the Aeronautics Institute, said the federal government should try to provide protection from asteroids that scientists call "Earth crossers."

The institute is asking the government to spend up to $5 million on new telescopes to look for Earth crossers over the next 10 to 15 years.
Asteroid Scares Begin to Diminish...

Robert Roy Britt, Space.com, 3 Sept. 2003:

“A newly discovered asteroid that generated doomsday headlines around the world yesterday morning was, by the end of the day, reduced to innocuous status as additional observations showed it would not hit Earth.

Meanwhile, a whirlwind of media hype has astronomers and asteroid analysts arguing among themselves -- again -- about how they should disseminate information to the public....

The incident was just one in a long series miscues involving astronomers, their public relations efforts, and a media eager to report potential doom....

A handful of similar scares -- about one per year -- have evaporated in similar fashion as professional astronomers go about their business of finding and tracking potentially dangerous asteroids.

There is an increasing sense of sarcasm in the media with each new asteroid scare. Some reporters and editors are getting wise to the long odds -- or perhaps tired of having to report on them -- and doing more than just sensationalizing the data.”
Serious Journalistic Attempts to Explain NEO Science

ANNALS OF SPACE

IS THIS THE END?

It's very unlikely that a major comet will crash into the Earth—but not so unlikely that leading scientists around the world haven't begun to plot ways to make sure it doesn't happen.

BY TIMOTHY FERRIS

DEATH FROM ABOVE

The world was to end with what astronomers call “death from above,” the first clue might come with the closer, in orbits that cross Earth's. For nearly thirty years, Marsden has watched them come and go, and has heralded their arrivals like a butler announcing guests at a ball.

MINUTES later, Marsden's message...
TV, DVD, Web Documentary

- Alternative/visual media
- TV science series (NOVA)
- “Science” TV Channels (e.g. Discovery)
- Network TV specials
- Independent productions
- “Educational” products by planetariums, academia, NASA, etc.
- YouTube briefs; blogs
- Distributed as DVDs, digital downloads
Issues

- Goal: to inform citizens, opinion leaders, and officials about the reality of the impact hazard so that society and individuals can take appropriate action (or not)...but not over-react
  - neither inflame nor minimize this hazard
  - common media motives: sensationalize, entertain
- In past decades, there have been some dysfunctional “scares” based on hype or mistakes
- How to communicate about very bad but very unlikely hazards: such risks are not intuitive, but the NEO hazard exemplifies other important societal hazards
- An important role for the currently diminished numbers of science journalists: be the interface between highly specialized, often inarticulate scientists and the scientifically illiterate public