

Yellowstone: Supervolcano Hazard

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INTRO

Many of these ongoing events regarding Yellowstone were documented on Hannity forums, discussed in a thread there titled "[*ALERT* Yellowstone Supervolcano](#)". Some of the confirmatory posts in that thread are: [#733](#), [#818](#), and post [#842](#) (regarding about taking down seismographs overnight Jan 27th), and [#875](#) (indication of the start of the previously anticipated seismic refraction work, recognized as a grouping of p-wave 'spikes' on the seismograms showing charge detonation). Post [#875](#) originally linked to [this YMP Yellowstone seismograph image of January 28th, 2011](#)).

As a result of [volcanic tremors on January 25th, 2011](#), I and another "Intermediary" made contact with a Ph.D. USGS volcanologist at UofUtah, which oversees Yellowstone ("Magma Throat"), with that intermediary being a familial friend of the volcanologist. That volcanologist/geologist was [James C Pechmann](#), whose wife ["Joyce" also works with UofUtah](#), which is how we knew the departure time from Salt Lake City to Yellowstone on January 27th, to the minute, for the week-long seismic refraction survey, done in the middle of winter, with some 8 feet of snow on the ground. Wives tend to talk, specifically being Intermediary's wife with Joyce. Pechmann eventually had his job threatened and a reprimand put in his record because of his communications, despite the fact that none of Pechmann's communications involved release of data, nor any conclusions regarding that data and ongoing investigations, on his part.

The result of this information led to persons witnessing seismic refraction detonation signatures (spikes) "live" on the Internet streaming seismographs, beginning on January 28th. Here is [one example seismograph showing detonation p-wave "spikes"](#), with this seismograph having previously been taken off-line (calibration of seismographs overnight, to use as geophones), then powered-up but not registering, and then finally set to register immediately before the charge detonation "spikes" are set off for seismic mapping of the magma chamber.

Currently (early May) most of the geysers are not allowed visitors, and Old Faithful is erupting for as long as 8 or 9 minutes, but only having the recharge time in between eruptions equivalent for much short "two minute" eruptions. Also geologists are currently installing a perimeter of deep bedrock water wells (approximately 150) on the

northern side of the geysers, with as many as ten of these wells giving off steam upon completion. On April 4th, 2011 the [soil temperature of Vixen Geyser](#), in the vicinity of Norris Junction, spiked in less than 24 hours, from 30+ °C to 60-70+ °C, and remains elevated. The area of Norris Junction and Vixen is generally considered to be a good litmus test to overall activity at Yellowstone, with the above reference indicating, *“soil temperature at this site may be an effective indicator for basin-wide changes in groundwater flow and heat discharge.”*

"SCIENTIFIC INTEGRITY":

The government policy, "lock-down" of information under rubric of national security, is consistent with the [Presidential Memorandum on Scientific Integrity](#), dated March, 9, 2009, and conforms to the 2010 guidance and recommendations of the White House Office of Science and Technology Policy.

The policy covers all departmental employees when they engage in, supervise or manage scientific activities, analyze and/or publicly communicate information resulting from scientific activities, or use this information or analyses in making agency policy, management or regulatory decisions. **It also covers all contractors, cooperators, partners, volunteers, and permittees who assist with scientific activities.**

Without specific reference, I can say these terms have been strictly applied to even those sub-contractors only remotely involved in Yellowstone field work.

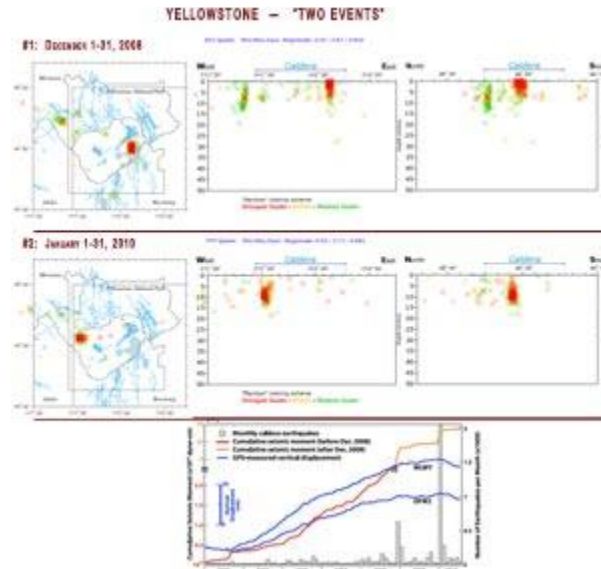
This "Presidential Memorandum on Scientific Integrity" was instituted in [Yellowstone Volcano Observatory's \(YVO\) "Hazard Response Protocols"](#) in June 2010, essentially bureaucratizing the Hazards response to political agendas. . Under YVO's Hazards Response scheme, there is cause for concern given that responses are tailored to stratovolcano conditions, which would operate on quite a different time-scale than would a Yellowstone "supervolcano", which likely escalates on a more extended time-frame. These Hazard Response triggers still remain discretionary even when 3 criteria are met (1) Earthquake swarms, 2) rapid displacement, 3) significant hydrothermal explosion), all of which have occurred, but spread out over time, during the period of "extraordinary caldera deformation", referenced below.

IMAGE: [Yellowstone Historic Eruption Scale & Ash Outflow vs Mt St Helens \(a stratovolcano\)](#)

"TWO EVENTS":

YELLOWSTONE

"TWO EVENTS"



[\(click for larger image\)](#)

The data in the above "Two Events" image was chosen from the period of **"Extraordinary Caldera Deformation episode"** that occurred between 2004 and 2010 (and is still ongoing).

During that period of 'Extraordinary Caldera Deformation' two periods of quake activity occurred, indicating singular events, as defined by the number of quake events in one-month periods of time. These two spikes in quake activity are seen in the bottom graph in the above image ([originally provided by USGS here](#)), with those two months each showing tremendous upsurges in quake activity, specifically being **December 2008** and **January 2010**.

TWO EVENTS

Event #1: December 1 - 31, 2008:

Event 1 shows the primary area of quake activity to be located in the eastern side of the caldera area, at the northern area of Yellowstone Lake. This area coincides with the area of extraordinary uplift over the 2004-2010 period involving both uplift and lateral displacement away from the area of focus. Strong quake activity can be seen to occur from ~5 mile depth to near ground surface.

The secondary area of quake activity is to the west, outside of the park area, in Idaho. This area shows a similar shallowing of quakes.

Event #2: January 1 - 31, 2010:

Event #2 has a primary area of focus on the west margin of the caldera area with strong quakes occurring from a depth of ~15 miles to less than 5 miles. There is continued quake activity in the primary location of Event #1, near the eastern margin of the caldera.

These quake events indicate two primary Areas Of Concern (AOCs) within the caldera, with at least a 3rd area existing outside the park footprint, in Idaho.

These AOCs represent likely places for original eruption(s), which may result in an "unzipping" of the caldera, resulting in a much larger eruption event. Even USGS itself has recognized that these quakes are not likely geothermal, but rather the result of magma rising from depth. Overall, these "Two Events" are indicative of ongoing processes of magma intrusion that did not cease after each spike in quake activity (quake 'swarm'), but rather only became less conspicuous.

OTHER REFERENCES:

VIDEO: National Geographic "[Naked Science: Super Volcano](#)" (good video)

Intermediary: William Howsden, Casper, Wyoming (bhowsden@bresnan.net)

Email Exchange: Peter Cervelli

Below are some references regarding the email correspondence, which follows, with Peter Cervelli, a public spokesperson for Yellowstone.

References in e-mail exchange:

Peter Cervelli Bio:

<http://alaska.usgs.gov/staff/staffbio.php?employeeid=40>

Article referencing Cervelli as "no eruption imminent":

http://news.xinhuanet.com/english2010/sci/2011-02/01/c_13715811.htm

Dan "Dz" Dzurisin:

<http://volcanoes.usgs.gov/insar/dz.php>

Notice: "He served as the CVO Scientist-in-Charge from 1994 to 1997, and currently he is **chief of the InSAR Applied to Volcano Studies project.** " InSAR does the GPS mapping of displacement. Cervelli's reference to a "GPS Campaign" in Yellowstone is undermined by Cervelli's own referenced map,

<http://earthquake.usgs.gov/monitoring/gps/YellowstoneContin/> , where the map

Legend shows the GPS points in and around the park are "Continuous" updates (electronically) and not by field "campaign", otherwise these would be represented as triangles.

Emails

On Mon, Feb 28, 2011 at 1:34 PM, TJ McCann wrote:

Mr Cervelli,

Whom would I contact about the availability of reduced data from seismic refraction work at Yellowstone, observed in real-time to begin on January 28th 2011?

I'm particularly interested in the most recent tomography mappings, and concerns about magma expansion believed to be occurring in several areas of concern, as indicated by quake concentrations to depth over time, with these locations being outside the caldera footprint, and Yellowstone itself, in the vicinity of Hebgen Lake, Montana.

Thanks in advance for any assistance in this regard.

Sincerely,

TJ McCann

On 2/28/2011 5:22 PM, Peter Cervelli wrote: Mr. McCann,

Several people have contacted me about this subject over the last few weeks. I know of no seismic refraction survey, nor any other geophysical survey that took place in January 2011. Do you have any other information that might be relevant, such as specific locations, equipment and vehicles types, investigator names, etc.?

There was a routine GPS campaign, conducted by scientists from the Cascades Volcano Observatory that occurred in February 2011. Data from that campaign is available here: <http://ehpm-earthquake.wr.usgs.gov/monitoring/gps/YellowstoneContin/>.

Peter

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Peter Cervelli
U.S. Geological Survey

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On Mon, Feb 28, 2011 at 7:43 PM, TJ McCann wrote:

Peter,

If there were no field effort, then obviously it would be impossible to come up with locations, equipment, vehicles, investigators, and the like. But then that would leave things like siesmographs going off-line at 22:25 MST on January 27th unexplained.

I'm certain that everyone with USGS, and attached to Yellowstone, is quite professional, but I do find myself concerned about the affect of the "Scientific Integrity" Memorandum on the scientific process, and "Right to Know."

Out of curiosity, was Dz involved in that GPS campaign, as he's involved in the inSAR process? I've not found a recent, full mapping of the inSAR data, and the references in the 2009 "Naked Science: Super Volcano" documentary appear to be 1996-2000 data. Would you happen to have a current source for this?

Incidentally, your link does not appear to be active.

I appreciate your patience and indulgence.

Regards,
TJ McCann

On 3/2/2011 12:37 PM, Peter Cervelli wrote:

TJ,

I am aware of the rumor that there was a seismic refraction survey in late January. I honestly don't know anything about such a study and I expect that I would know if it had occurred. If you have details about the rumor, I would like to hear them in order to figure out how the rumor started and what if anything it is based on.

The outage of 1/27-1/28 was caused by an unexpected reboot of a data server at UUSS. Several Yellowstone stations do not route their data through UUSS, however, and those stations were unaffected by the outage. See for example, LKWY.

Scientific integrity is something I take very seriously and always practice. And, throughout my career I have always advocated for the free and timely release of data to the public.

Dan Dzurisin (Dz) was indeed part of the recent GPS campaign. In fact, he led it. I'm not an expert on InSAR data, but there have been several papers published on Yellowstone deformation over the last decade, many of which are listed here: <http://www.uusatrg.utah.edu/>.

Sorry about the bad link. The correct one is: <http://earthquake.usgs.gov/monitoring/gps/YellowstoneContin/>.

Peter

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----- Original Message -----

Subject:Re: Interest in current data
Date: Wed, 02 Mar 2011 19:00:07 -0500
From: TJ McCann
To: Peter Cervelli

Peter,

I appreciate your reply and your candor; I had begun to believe that our communication had ended, which is understandable given that PR is not the mainstay of your position.

I was reasonably certain that you would indeed know about any refraction survey, which is why your request for vehicles, equipment, locations and personnel struck me as somewhat peculiar. I'm glad to learn that the rumors are untrue, and it was only a premature April Fools.

I happened upon your on-line bio, and was surprised to see your initial focus in "Philosophy". I imagine the transition to physical sciences and geology required a good degree of determination and focus on your part. Quite some time ago I found myself in a similar position with a declared major in the humanities.

Regarding the "Scientific Integrity", I'm certain that scientific professionals, individually, take these matters seriously. My own concern is when the scientific process becomes corrupted by, and filtered through, political structure, as established by that memorandum. I also have concerns about the alert triggers for YVO's Hazards Response scheme being tailored to stratovolcano conditions, and being discretionary until 3 criteria are met (EQ swarm, rapid displacement, significant hydrothermal explosion), but then I don't pretend to be a volcanologist.

Thanks for the corrected link.

Regards,

TJ McCann

Volcanic Ash

Many consider volcanic ash to be similar to ash from, say, combustion of organics, like wood. Unfortunately, that's not an accurate understanding of volcanic ash:

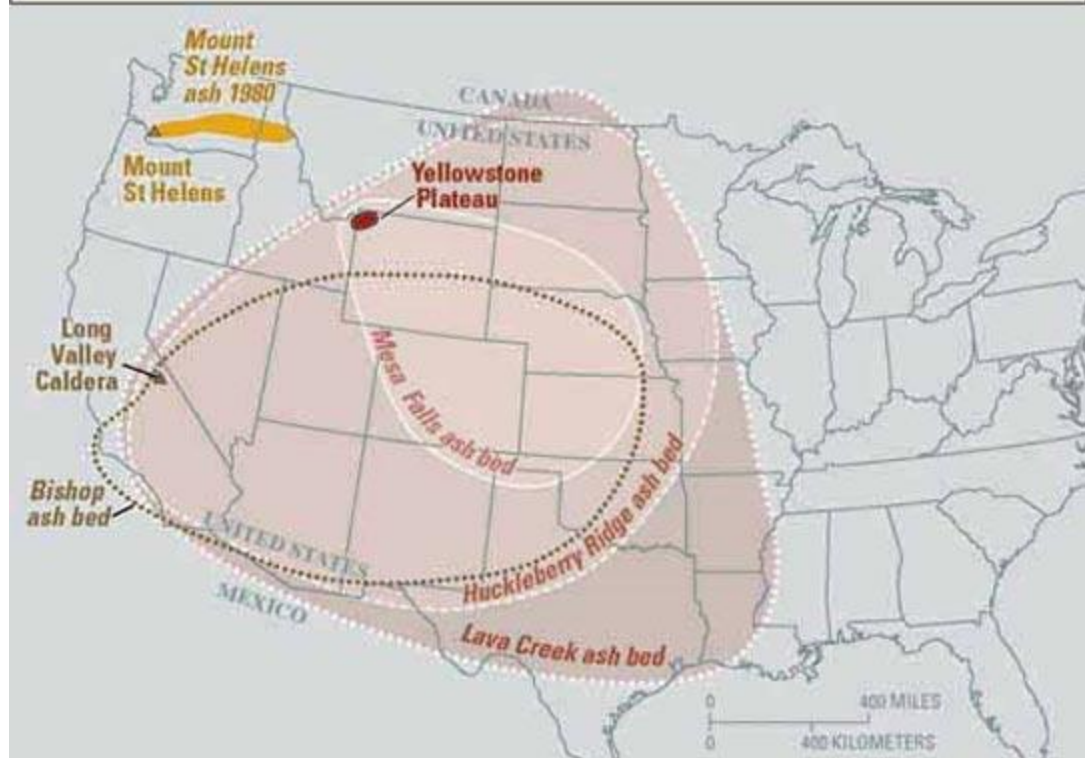
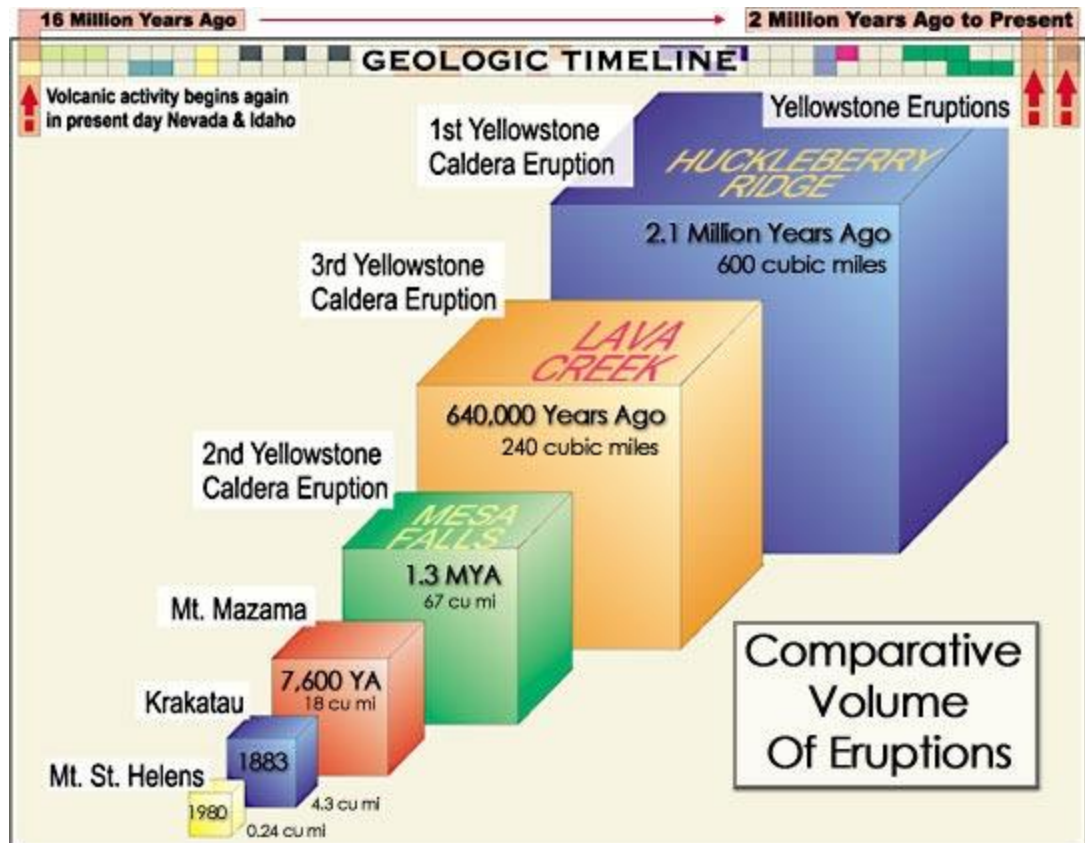
Unlike ash produced from the combustion of organics, volcanic ash is the result of the violent explosion of rock from de-gassing, forming minute shards of glass with jagged edges. Volcanic ash, unlike ash produced by the combustion of organics, is obviously not soluble in water, so if you get it in the tiny alveoli of your lungs, the sharp edges of this very fine volcanic ash lodges in the lungs, and is more apt to remain there.

If volcanic ash gets in one's lungs, a person might suffocate from that ash, which again will not dissolve in body fluids. However if one only inhales only some ash, but does not die from suffocation, that ash will lacerate the lungs, causing tremendous pain, and something even worse - a biological effect similar to [Marie's Disease](#). The fine ash lodged in the lungs creates lacerations and inflammation in the alveoli, resulting in a decrease of oxygen intake into the blood, triggering the body to redirect blood-flow and oxygen to the vital organs. The result is that insufficient oxygen is supplied to the bone and skeletal structure, with this beginning to die. As a response to this bone-death, the body begins to rapidly generate new bone to compensate for the death of the existing bone structure.

This new bone growth causes arthritis-type pain all over the animal's body. Death results after a prolonged period of absolute agony. A paleontologist, Mike Vorhees, discovered this effect from volcanic ash inhalation and "Marie's disease" in the 70's, which he recognized fossilized skeletons founded surrounding a watering hole in Nebraska, described in this [National Geographic video at the time marker 24:13 to 31:41](#).

Reference: National Geographic "Naked Science: Supervolcano":
http://www.youtube.com/watch?v=7as7Ej_U6yU#t=24m13s

The tiny vesicles (holes) in this extremely fine volcanic ash are also extremely good at holding water. Just a few inches of this can collapse a roof. Add moisture to this and it becomes six times heavier than snow, certainly able collapse stronger roofs and many structures, removing many safe havens from the ash-fall itself. This fine ash will also penetrate power lines and transformers, shorting them out, and resulting in power outages over much of the United States.



Ash Outfall of 3 Historic Yellowstone Eruptions

Furthermore, the ash from a "super eruption" would settle over the breadbasket of the

country, first killing all cattle and livestock, and then settling down on the land to depths of feet, traveling even 1000's of miles to do so. This ash will remain there generally, and is incapable of growing plants, because it is biologically inert, also destroying American agriculture.

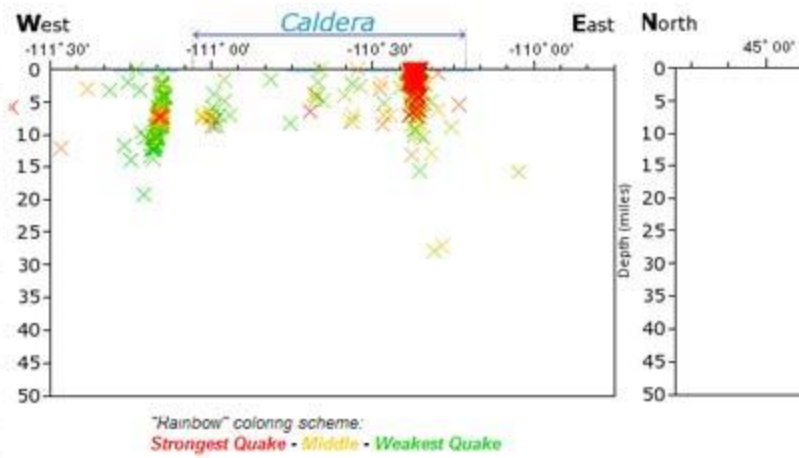
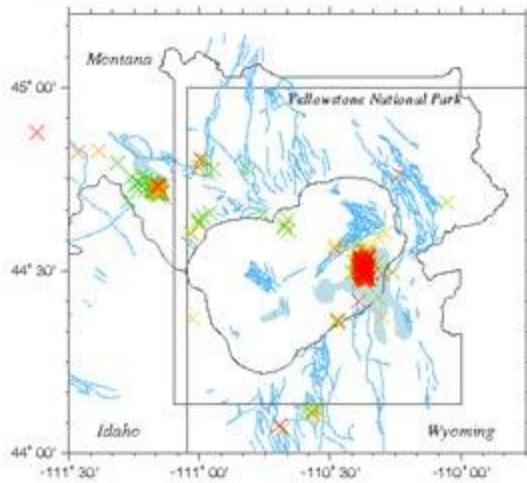
Then there's the longer term "dimmer effect" to the atmosphere, causing the equivalent of a nuclear winter ("volcanic winter"), diminishing the growing season to an interval where plants cannot be harvested before being killed by frost in many farming regions. And this will happen in many agricultural regions all over the planet for years to come. Evidence shows this sort of "volcanic winter" has happened before, some 74,000 years ago, from the Toba eruption.

However it's important to recognize that a "super eruption" of this size is quite-a-lot-less-than-certain. There have been 100's of eruptions from Yellowstone in between the three recognized super eruptions, with these not being so explosive in nature, but rather more placid lava flows. The primary determinant of the explosivity of an eruption is the amount of continental crust silica dissolved in the magma "melt", making it more viscous, and thereby more likely to explode violently when reaching the surface quickly. Generally the rule of thumb is that a 50% melt level is considered explosive.

YELLOWSTONE – “TWO EVENTS”

#1: DECEMBER 1-31, 2008

863 Quakes Min/Max/Equiv. Magnitudes: 0.00 / 3.87 / 4.860



#2: JANUARY 1-31, 2010

999 Quakes Min/Max/Equiv. Magnitudes: 0.00 / 3.77 / 4.882

