HLWYM HEmails

From: Brittain Hill
Sent: Thursday, March 23, 2006 8:44 AM
To: Donald Hooper; Keith Compton
Cc: Roland Benke
Subject: Re: accelerated erosion figure

While I agree that understanding the lifetime behavior of the deposit is important, the risk-significance driver is the evolution of the deposit during the first 1,000 years post-closure. If we underestimate tephra deposit yield during that time, we may be underestimating tephra (i.e., HLW) concentrations in the fan deposit by 2-4x. Although a long-term average may accurately integrate the total yield under the curve, it may be a poor abstraction of yield during those critical 1,000 years.

We can do exploratory analysis with the 5.1 model using the current approach. But I am much more concerned with realistic HLW concentrations during the period of peak risk, rather than how long the deposit may exist on the proximal slopes. I don't favor randomly sampling the increase in tephra yield, unless we have a strong technical basis to constrain the range based on YM characteristics. Paricutin, Sunset, Cerro Negro, MSH etc provide insights, but are poor analogs for constraing this YM-specific parameter.

I think we're good to go for ACNW tomorrow, but need to chew on this a bit more during Keith's tech exchange.

Thanks-
Britt

>>> Don Hooper <dhooper@cnwra.swri.edu> 03/22/06 7:19 PM >>>
Keith,

About that figure 4-4 from the Hooper redistribution report. My fault for not better explaining accelerated erosion as computed by a diffusion model.
I think that shows it could be replaced (one of my possible paths forward).
Recall that you could draw a straight line across it at a relative sediment yield of 2 (which is what TPA does) for the lifetime of the deposit. This may account for the volume (mass) of sediment transported over time about as well as any other (more elegant) method. The problem with 2X is that it fails to account for the critical (risk-significant) early years immediately after the eruption. I need to revisit that as an offline calculation.
Maybe we can uniformly sample this between 1 and 10 or 1 and 50, etc. But we're only varying one poorly known parameter (relative sediment yield) as this is currently set up.

I still feel that 4.6X is too low of an accelerated erosion value and that 25,000 years is too long (even for an arid environment). I think the shape of the curve is basically correct. And we're not even delving into geomorphologic issues, such as soil stabilization, changing slope angle, and diminishing size of the initial deposit. Perhaps part of the problem lies with what I would call relative time vs absolute time. Figure 4-4 is describing a sediment transport process, a proxy for a potential tephra deposit in the YMR. The deposit may be depleted before you reach 25,000 years. To start compressing or extending the curve to fit a deposit of a certain size becomes a priori. Although this curve has the opposite slope, do we reach our monetary retirement goals before actual retirement? How well do we follow that mean curve set up by our financial advisor?

And I still need convincing that [tephra] vs [tephra + ambient sediment] is an issue (you still have normal "ambient" erosion occurring in the tephra-affected basin). (This is your sed yield minus 1 solution.) I'm rambling, time to end this ...

I look forward to discussing this with you during your staff exchange next month.

We have the bridge number for Friday morning. Good luck,

-Don

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