

HLWYM HEmails

From: David Pickett [dpickett@gargol.cnwra.swri.edu]
Sent: Wednesday, April 18, 2001 11:19 AM
To: Bret Leslie; WMurphy@csuchico.edu
Subject: caliche

Bret & Bill,

(Bill, I reverted to your CSUC address - hope that's OK.)

The possibility of a significant dry fall component has always been in my mind, and it will continue to be as we get more analyses and look at the existing numbers. Some stuff I've looked at but haven't talked about with you yet is my leaching results. These suggest large proportions of U in the non-leachable component in many of the caliches. One question about this component would be: dry fall or silica? Another point to keep in mind is that some of the mobilized U, whether particulate or aqueous, could already have non-unity 234/238 because it comes from secondary material.

I'm sorry this sounds sketchy; I don't have the time right now to dig deeper (Navy criticality and IIRSR are pressing), but I appreciate the dialog and want to keep it going. Rest assured I'm not taking it on faith that all the U in these samples was aqueous.

David

> -----Original Message-----

> From: Bret Leslie [mailto:BWL@nrc.gov]
> Sent: Wednesday, April 18, 2001 7:37 AM
> To: [REDACTED] BillRui@nrc.gov
> Cc: dpickett@gargol.cnwra.swri.edu; MLW3@nrc.gov
> Subject: Re: (no subject)

>

>

> Bill,

> I am having our secretary (Mellisa Wyatt: mlw3@nrc.gov) xerox the
> relevant pages. If you need them faxed, please provide her your fax
> number and if you just want it mailed let her know where to send them.
> The material is from INTRAVL Phase
> 1 Case 8 The ARAP (1992).

>

> My impression is that the NWTRB was educated by the discussion and
> material that was presented. I believe that the NWTRB, going into the
> meeting, was not clear in their own minds what they wanted in terms of
> the safety case. Do they really want DOE to have independent lines of
> evidence (from PA), or does the NWTRB just want DOE to explain the
> safety case in terms other than PA. I believe

>

> Regarding isotopic evidence, I don't think the "I imagine that the
> dust would have a U/Th ratio like the source (which is probably
> dominated by the local deposit), but aqueous transported material
> would have much higher U/Th in young caliche" is totally correct.
> Actually it is a bit more complicated. Remember when we are talking
> high concentration U in caliche this implies that there is lots of
> 238U. In general there is an inverse relationship between activity
> ratio in solids and the concentration of U.

> This is because at low concentrations the effects of recoil-induced
> ^{234}U is more prevalent. At high concentrations, requiring higher
> ^{238}U , U must be mobilized by dissolution, and there should not be ^{234}U
> enrichment in the precipitating solid (caliche or opal). Also the
> ^{234}U enrichment in secondary mineral precipitation is a function of
> pathlength. Suppose water infiltrate at the surface and picks up ^{234}U
> preferentially as a result of alpha recoil. As that water progress
> the amount of ^{234}U enrichment should increase. This is why at Yucca
> mountain there is a gradual increase in $^{234}\text{U}/^{238}\text{U}$ ratio with depth in
> the secondary minerals (at least that is what Brian Marshall and Jim
> Paces are trying to model). Thus at Nopal I expected that the
> $^{234}\text{U}/^{238}\text{U}$ ratio in caliche above the deposit to not be too enriched from
> recoil. This is because the path length of flow is relatively short.
> I did think it would be larger than authigenic phases hydrologic below
> the deposit. As I recall the $^{234}\text{u}/^{238}\text{u}$ ratio was close to 1.9, while
> the opal and caliche have values closer to 1.

>
> Hope this helps,

> Bret

> >>> [REDACTED] 04/18/01 07:31AM >>>

> Bret,

>
> It was good seeing you at the TRB meeting. What was your impression of
> that meeting?

>
> I'm curious about the ARAP paper you noted on tracing U-series
> isotopes through a transport process. It could be relevant to the
> GEOTRAP talk/paper - isotope fractionation and PA. Can you give me a
> citation? I left my ARAP stuff in San Antonio.

>
> I'm still concerned about dry fall contribution of U to caliche at
> Nopal (e.g., in relation to the Migration abstract). I imagine that
> the dust would have a U/Th ratio like the source (which is probably
> dominated by the local deposit), but aqueous transported material
> would have much higher U/Th in young caliche. Are there other isotopic
> ways to test the transport mechanism?

>
> Bill

>

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Email Number: 1444

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Subject: caliche
Sent Date: 4/18/2001 11:18:37 AM
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From: David Pickett

Created By: dpickett@gargol.cnwra.swri.edu

Recipients:

"Bret Leslie" <Bret.Leslie@nrc.gov>

Tracking Status: None

"WMurphy@csuchico.edu" <WMurphy@csuchico.edu>

Tracking Status: None

Post Office:

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MESSAGE	4472	4/18/2001 11:18:00 AM

Options

Priority: Standard

Return Notification: No

Reply Requested: No

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