**Earth and Life**

*Tibet: The significance of the strontium ratio*

**Nigel Harris**
These mountains lie at the border between Nepal and Tibet, and this one is made entirely of granite and this granite formed from melting of continental crust about twenty million years ago. Now of particular interest to us is that the chemical weathering of this granite has had an important implication for the strontium isotopic composition of the world's oceans.

**Voice Over**
Strontium is important to geochemists because the ratio of two of its isotopes, Strontium87 and Strontium86, in seawater can provide a measure of the rate of chemical weathering of the continents. Here then was a test for the two models. Measure the strontium isotope ratio in ocean sediment and see if you could detect any increase or decrease on a geological timescale.

**Maureen Raymo**
The strontium record's kind of the piece of the puzzle I guess that fell into place that kind of made it all click. I knew the history of the uplift of the Himalayas, I knew there was a lot of chemical weathering going on here today, but I didn't really have any, I you know, I didn't really have a really good geologic record of how chemical weathering had changed through time, then when I saw a strontium isotope curve for the first time, when I started being a graduate student of Don DePaolo, it's just gorgeous, and I realised that this was kind of, you know, a smoking gun, so to speak.

**Voice Over**
The lab that revealed the smoking gun? Don DePaolo's lab at Berkeley, California, where they'd analysed strontium isotopes from the last hundred million years of sediment.

**Don DePaolo, University of California, Berkley**
What we found as we got further into the strontium work was that the curve got more and more interesting. The problem was we weren't exactly sure what it meant. From about 80 million years ago to 35 million years ago almost nothing happened, and then at 35 million years ago wham - the strontium curve starts to go up like a rocket. Now it also turns out that about the same time Maureen Raymo and Ruddiman had come out with their ideas about how the Himalaya and the erosion of the Himalaya were affecting the Earth's climate, and they in fact used the strontium data as evidence that erosion and weathering rights were changing, and this was support for their ideas.

**Voice Over**
However not everyone agrees that the strontium 87/86 curves are a simple measure of the rate of continuity weathering. Can geochemists distinguish high weathering rates from the weathering of unusual rocks?

**Nigel Harris**
I think that's a very tricky question and all I would say is that the granites formed in the Himalayas, these leuco-granites, are exceptionally high in 87 strontium; the 87/86 ratio of these granites is very high indeed, much higher than almost any other granites in the world, so what we've got here is a ready source available at the surface to provide the increase in 87/86 strontium seen in the oceans. But that doesn't prove that increased chemical weathering didn't also play a role.

**Voice Over**
There's no argument that the Himalayas are the site of massive erosion. It's estimated that six kilometres of rock has been eroded off the mountain ranges, but erosion alone won't change the climate. For that some of the erodent rocks must be dissolved.