The stress/heat flow paradox of the San Andreas Fault, California

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According to conventional uniformitarian thinking, the San Andreas Fault represents a plate boundary between the Pacific plate to the west and the North American plate to the east. The Pacific plate has been supposedly slipping northwest with respect to the North American plate at about 6 cm/yr for the last 30 million years of evolutionary time. At this rate, the west side of the fault should have been displaced about 1,800 km. Furthermore, the friction of this shearing should have produced a large amount of heat at the fault. A 3.5 km borehole near Cajon Pass on the San Andreas Fault has revealed that the expected heat from the fault is missing.[1]

This paradox was discussed in a recent article in the science section of *San Francisco Chronicle* of 18 December 2000.[2] The article stated how researchers have measured only one half to one third of the expected heat, and that the lack of heat is a major unsolved scientific mystery:

> 'And for a third of a century, they've been baffled by the results.
> If current theory is correct, friction along the moving fault should generate much more heat than scientists have been able to find so far.
> It's common sense: if you rub your hands together, they get hot.
> Yet—in seeming defiance of common sense—the rocks rubbing together along the San Andreas are astonishingly cool.'[2]

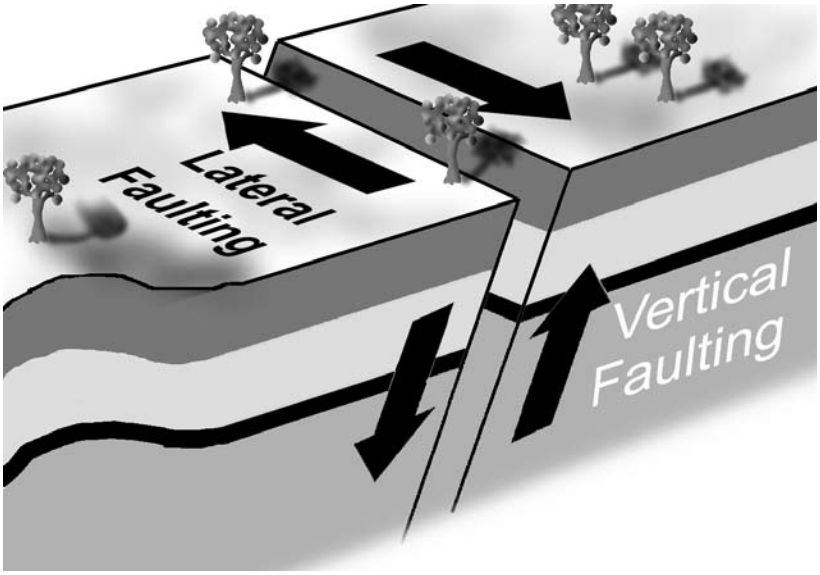
That is not all, other aspects of the fault are equally baffling:

> 'As its name implies, missing heat is only one aspect of the stress/heat flow paradox. The other aspect is equally baffling: wrong-way crustal stress. The San Andreas Fault moves in one direction, yet localized ground stresses sometimes vary from that direction by almost 90 degrees.'[2]

Dozens of hypotheses have been proposed to explain this paradox. Maybe there is something wrong with the current theory—an incorrect basic assumption as stated in the first quote above?

At face value, the implication of the stress/heat flow paradox and the wrong-way crustal stress is that the San Andreas Fault has not slipped that much. That is why a number of scientists have disputed the conventional idea of such tremendous right lateral strike-slip movement on the San Andreas Fault.[3] For instance, Bruce Martin details evidence of only slight lateral movement with more significant vertical motion over the assumed geological time.[4] This sort of movement was observed with the deadly Loma Prieta earthquake of 17 October, 1989, south of San Francisco. Geophysicists puzzled over this earthquake puzzled because, as well as 1.5 m of lateral movement, it produced one meter of vertical slip.[5]

Many geologists reluctant to accept this evidence at face value. However, if the conclusions are correct and there is little lateral slip on the San Andreas Fault, then the uniformitarian, millions-of-years paradigm has a serious problem, one among many normally ignored.[6]



Evidence suggests that the San Andreas Fault may have more vertical faulting than previously thought. Obviously this could not continue for millions of years.

References

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