HOW MUCH GAS TO KILL A DINOSAUR

The KT extinction coincided with the emission of the Deccan Traps which are extensive basaltic lava flows in India. The volume of the Deccan Traps is 1.5 x 10^6 km^3 and they were emitted over a period of half a million years. Many of the individual lava flows have volumes of 5000 km^3. Recent calculations show that each cubic kilometre of lava would have emitted 4.5 x 10^6 tons of SO_2. These flows would have taken between one and 10 years to form.

The total volume of SO_2 per 5000 km^3 lava flow would have been?

The rate of release of SO_2 per year if the lava flow had formed in one year would have been?

The rate of release of SO_2 per year if the lava flow had formed in 10 years would have been?

If all the flows had been this size how many would there have been and how frequent would they have been?

As a comparison today's anthropogenic SO_2 is 8.0 x 10^7 tons per year Modern volcanic activity is on average 1.0 x 10^7 tons per year

In 1783 Laki lava flow in Iceland with a volume of 565km^3 released 2.5 x 10^9 tons SO_2 into the atmosphere that killed 77% of the sheep, 76% of the horses, 50% of the cattle and 25% of the humans. It cooled the north eastern USA by 10°C and the whole world by 1°C.

Data have been taken from an article in Planet Earth Spring 2008 by Drs Steve Sparks and Steve Blake.