50 & 100 YEARS AGO

50 YEARS AGO

To meet the great world-wide interest in nuclear science and its applications, it has often been suggested that regional centres should be created ... The first of such centres to be established is the CENTO ... Institute of Nuclear Science, formerly the Baghdad Pact Nuclear Centre, which now serves the three countries of the CENTO region, Iran, Pakistan and Turkey. The Institute is concerned exclusively with the peaceful uses of nuclear science ... The original Nuclear Centre in Baghdad was formally opened on March 31, 1957 ... and trained about sixty Middle East scientists in nuclear techniques, before the Iraqi revolution brought operations to a close. A decision to re-establish the Centre in Tehran was taken jointly by the CENTO countries in January 1959, and on June 23, 1959, H.I.M. the Shahenshah of Iran performed the opening ceremony in the presence of a distinguished audience.

From *Nature* 14 May 1960.

100 YEARS AGO

King Edward the Seventh is no more. An Empire is in mourning. The death of the King has come with a suddenness which has stunned his people, who, however, have already given no uncertain signs of the deep love and respect they entertained for a ruler who always strove to do his duty. Her Majesty the Queen-Mother and the other members of the Royal Family know full well that they are not the only mourners, and that the sympathy of millions in the widest Empire the world has known, and others outside it, is extended to them in their personal loss ... In the midst of the nation's grief at a loss so great and so sudden that there has not been time to realise it, comfort may be found in the assurance which we possess that in the future, as in the past, the illustrious Royal Family will guard the best interests of our Empire.

From *Nature* 12 May 1910.

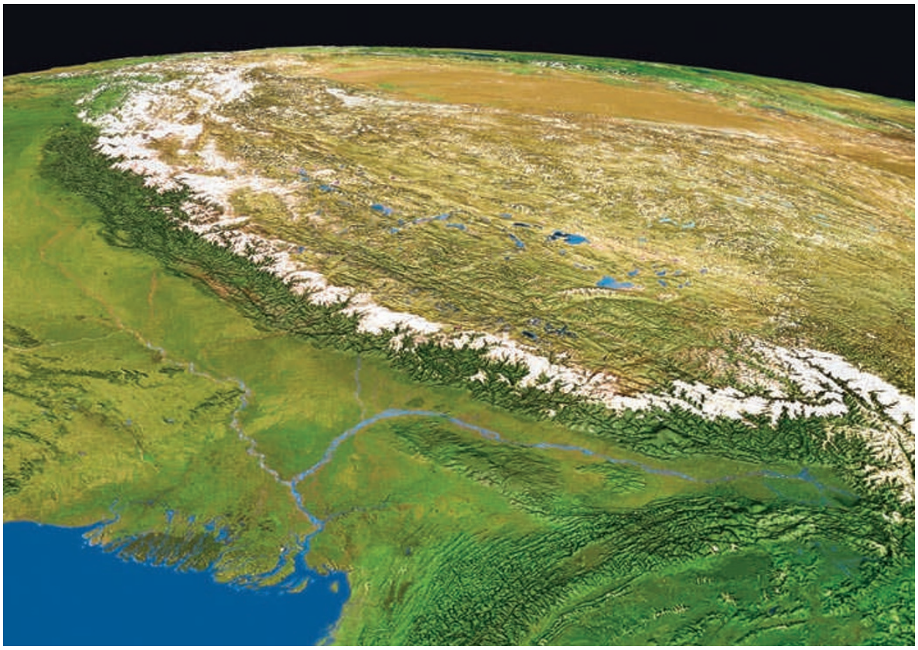

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Figure 1 | Mountain high (but erosion low?). The vast extent of the Himalayan range is evident from this satellite image, in which the Ganges delta is also prominent.

suggest that the previously observed[6] fourfold increase in the global erosion flux over the past 5 million years might be an artefact introduced by biases in observations and measurements.

Erosion is indeed producing sediments, and measuring the mass of those sediments allows inferences to be made about the intensity of the erosion process. But as time passes, the probability is that these sediments are themselves destroyed by subsequent erosion, altering the initial record of the erosion intensity. The actual erosion rates are consequently underestimated as we go back in time. Willenbring and von Blanckenburg demonstrate that, once corrected for this recycling effect, erosion rates of the continents remained roughly constant through the late Cenozoic, despite the uplift of mountain ranges.

But if global erosion remained constant during the late Cenozoic, does this mean that CO_2 consumption by rock weathering also remained constant? According to Willenbring and von Blanckenburg the answer is 'yes', on the basis of the message carried by beryllium isotopes. The authors measured the $^{10}Be/^{9}Be$ isotopic ratio of many deep-sea sediments spanning the past 10 million years of Earth's history. The ^{10}Be is continuously produced in Earth's atmosphere by cosmic rays, and then falls to the planet's surface at a constant rate. The flux of ^{10}Be is assumed to be constant over the past 10 million years. This isotope is then mixed with stable ^{9}Be released by rock dissolution, and in due course both isotopes are buried in oceanic sediments. Once corrected for the radioactive decay of ^{10}Be through time, the measured $^{10}Be/^{9}Be$ ratio in several sediment cores from the Arctic, Atlantic and Pacific oceans seems to be constant, suggesting that the rock weathering and coeval CO_2 consumption remained stable from about 10 million years ago. This is consistent with the finding that physical erosion, which is suspected to control rock dissolution rates, is also found to be constant over the late Cenozoic.

Willenbring and von Blanckenburg[1] conclude that the global climate cooling in the late Cenozoic had nothing to do with the geologically recent mountain uplift. This view seems to be further strengthened by some reconstructions of atmospheric CO_2, suggesting that there has been little change in CO_2 concentrations over the past 20 million years[7].

This leaves new questions, however. Physical erosion is undoubtedly affected by mountain uplift. It increases locally where uplift is active because of the development of steep slopes and the onset of dynamic mountain glaciers[8]. Today, more than 20% of the total dissolved and suspended mass delivered to the oceans comes from the Himalaya and the Andes, carried by three rivers — the Brahmaputra, Ganges and Amazon. How could this flux have remained constant at the global scale for 10 million years while large-scale mountain uplift was occurring?

One explanation could be that there was a coeval decrease in physical erosion outside the uplifted regions. The link might be climatic, because physical erosion also depends on climate, particularly on water run-off. A cooler climate, possibly triggered by CO_2 uptake in mountain ranges, may have decreased physical erosion outside the uplifted areas (and consequently decreased chemical weathering). We can speculate that drier conditions, together with the growth of large, stable ice sheets, may ultimately have decreased erosion of the continental surfaces, counterbalancing the uplift effect.