Mapping IVC’s Rainfall Patterns

What is the issue?

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- Indus Valley Civilisation flourished along the course of river Indus and was one highly depended on a perennial water source for sustenance.
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- While there are varying claims on civilisation’s climate, a recent research has asserted that the civilisation was at its peak during its wettest phase.
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What is Indus Valley civilisation (IVC)?

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- Indus Valley civilisation (IVC) is one of the earliest known organised urban human settlements, which flourished around 2000 BCE.
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- It flourished in the north-western parts of the Indian subcontinent, in the region around north Rajasthan, Haryana, Punjab, and Pakistan.
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- Its settlements are estimated to have flourished for 1,500 years between 3000 and 1500 BCE, and is said to have had its zenith between 2600-1900 BCE.
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- Those glorious 700 years is when the most modern townships of that era namely - Harappa, Mohenjo-daro, and Rakhigarhi is said to have flourished.
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- The decline of the IVC is attributed to several reasons - climatic, tectonic, and even social – all of which have varying degrees of evidence to support them.
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How critical was water in IVC’s progress?

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- Most scientists and archaeologists agree that the availability of abundant water was the most crucial enabler for the sustenance of the civilisation – just like most other contemporary ancient civilisations.
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- The presence of buried water channels and other archaeological evidence suggests the dependence of Indus people on a perennial source of water.
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- Many geological and climatic studies have indicated good rainfall patterns in IVC region during the civilisation's existence (although some disagree).
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What did the researchers rely on?

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- Gypsum deposits at an ancient lake "Karsandi" (now dry) on the margins of the Thar Desert in northern Rajasthan were studied by the researchers.
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- Notably, Karsandi is about 120 km northeast of Rakhigarhi, an important IVC settlement that has seen some exciting excavations very recently.
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- It is also near Kalibangan and Karanpura, which were also important centres of the Indus civilisation.
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- The scientists collected samples of different layers of gypsum and studied them in detail and carbon dated the fossils in them to establish dispositional age.
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- While many such paleo-lakes in the region have been studied before, this is the first time that scientists were able to devise a chronology of rainfall variations.
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- This analysis has asserted a clearly asserted that rainfall had a bearing on the expansion and contraction of Indus urbanism (more rain more prosperity).
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What is the concept employed?

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- Chemical analysis of the layers of deposites in a paleo-lake gives indications about the composition of water at different times.
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- It thereby also gives indications on the environmental condition at the time of precipitation as the quantum of rainfall has a bearing on the deposits.
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- Gypsum is a common mineral deposits that remain after the evaporation of saline water bodies and usually found at the cites of paleo-lakes.
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- If deposits in a particular layer is pure gypsum, it is an indication of scanty rainfall and predominance of evaporation during that phase of deposition.
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- This is because the surrounding areas in the region are all very sandy, and if there was rainfall, the rains-fed streams would have brought sand to the lake.
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- Contrarily, if there was considerable rainfall, the deposites would have a mixture of gypsum (evaporation precipitate) and sand (run-off deposit).
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- Similarly, pure sand can be an indication of very good rainfall as erosion and deposition is likely to have dominated over the miniscule gypsum deposits.
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What were the specific conclusions?

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- These scientists have managed to establish a high resolution chronology of the wet and dry phases in the area between 9000 and 2000 BCE.
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- They have inferred that this region, northern part of Rajasthan, was largely dry till about 9000 BCE, which is 11,000 years ago from the present.
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- But between 9000 and 3000 BCE, there was substantial precipitation in the area, making it conducive for human settlements.
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- Further, monsoon is said to have intensified between 3000 and 2400 BCE, at the end of which a dry spell set in (which is continuing even today).
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- This showed that the peak of the civilisation almost coincided with the wet

phase when monsoon intensified for about 600 years about 5000 years ago.
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- As the dispersal of the civilisation also coincides with the onset of the dry phase, this strengthens the climatic theory for its rise and fall of IVC.
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- The study has implications for modern society as well, as we are witnessing climate change and perceptible variations in precipitation and temperature.
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Source: Indian Express

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