Bayesian Inversion

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- **Context**
- Scientists at ISRO have used a novel mathematical technique called Bayesian inversion and analysed satellite images to estimate the strength of North Korea's underground nuclear test of September 2017.
- It was found that the explosive yield was about 17 times that of the Hiroshima explosion.
- According to the test site analysis data, those tests are considered the most powerful thermonuclear devices to have been developed by the country.
- In the normal course, the detection and estimation of nuclear device explosions is based on the reading of earthquake monitoring sensors.
- The test site was at Mount Mantap, Punggye-ri.
- For the purpose of analysis, the images of the location of the explosion were sourced from the ALOS-2, a Japanese satellite, and Sentinel 1B, a European radar imaging satellite.

- This information is important to determine the type of bomb, and consequently, the degree of know-how the detonating country possesses.
- The uncertainties in the yield and source depth estimated using the Bayesian modelling of InSAR data were significantly less than that of seismic methods.
- InSAR refers to the interferometric synthetic aperture radar and is a radar technique used to generate maps of how a place would look after an earthquake or a detonation.
- According to ISRO, Bayesian inversion can correct for errors and uncertainties in the yield and depth data by

25-85% and 40-97% respectively.
- The estimates of a yield of 250 kilotons with the assessment held by the US scientists in June stated that the 2017 test was about 10 times more powerful than the tests first conducted by North Korea in 2016.