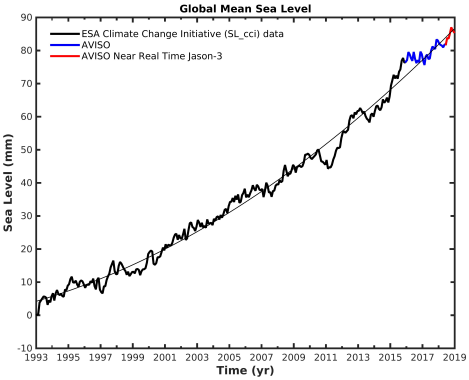
→ HOW DO SATELLITES HELP PROVIDE INFORMATION ON CLIMATE CHANGE?

To detect changes in the climate, a long time series – usually 40 years – of data are needed. From this, changes from year to year and decade to decade can be determined. These changes can be small but critical, such as the rise in sea level, currently measured in millimetres per year. Therefore it's essential that data sets used for climate research are accurate and consistent over a long time period.

Satellites are excellent at providing consistent data over the whole world, sending back vital information to Earth on inaccessible areas. However, they have finite lifespans of a few years to over a decade and there can be gaps between missions. To produce data sets long enough for climate research, the combination and inter-calibration of many different satellite missions is required.

The European Space Agency's **Climate Change Initiative (CCI)** programme does just this, by merging data sets from different missions and sensors in to one continuous series of data. Observations from ESA's 40-year archive, together with currently operating satellites, all contribute to making up these data series. This is done this for key components of climate change, or "Essential Climate Variables" that are measurable from space.



Twenty-five years of Global Mean Sea Level change (1993 – 2019), which is rising by 3.1 ± 0.3 mm/yr and accelerating by 0.1 mm/yr each year (thin black line). The time series was generated by merging data from several satellite missions as part of the ESA Climate Change Initiative Sea Level project (SL_cci) (black line) and is extended (in blue) by multi-mission data processed by CNES (AVISO) and Jason-3 "near real time" data up to 17 January 2019 (in red). © ESA (SL_cci) and CNES/LEGOS (AVISO)

The CCI programme feeds in to the Global Climate Observing System, which coordinates the provision of data for climate studies from the main observation networks – satellites, local measurements, aircraft, ocean buoys etc. It is this information that helps to underpin the conclusions made in the reports of the Intergovernmental Panel on Climate Change (IPCC). It is vital that we continue to make these measurements in to the future – the longer the time series, the greater their value to climate science and the world.

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