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Centennial Total Solar Irradiance variation : a paradigm shift for Sun-Climate research.

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A variation of the solar energy received by the earth – quantified by the Total Solar Irradiance (TSI) – is a radiative forcing for climate changes on earth. Since the 1976 Science paper by J. Eddy, solar-climate research has been dominated by the paradigm that solar activity and TSI have been slowly increasing since the Maunder Minimum - extending from about 1645 to 1715 – and the present, which was believed to be a Modern Solar Maximum. If this paradigm were valid, over the last 50 years, when most of the global warming has occurred, this warming would be partly due to anthropogenic greenhouse gas warming, and partly due to natural solar warming.

However, evidence has been accumulating against the ‘Modern Solar Maximum paradigm’. Based on this evidence, recently a new reconstruction of the centennial TSI variation from 1700 to 2020 was published. This new centennial TSI reconstruction is nothing less than a paradigm shift for Sun-Climate research. Following the new TSI reconstruction, the TSI did not gradually increase over the last 320 years, but rather varied with a long term periodicity of 105 years, and currently we are near the minimum of this 105 year variation. Therefore over the last 50 years, the sun did not contribute to global warming, but rather tried to cool the earth, partly counteracting greenhouse gas warming. Since we are near the minimum of the 105 year variation, we can expect a trend reversal and for the next 50 years we can expect that the sun will contribute to global warming, making it more difficult for mankind to reach the goals of the Paris Climate Agreement, in order to avoid catastrophic climate change.