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Solar radius measurements with the space instrument HMI (SDO)

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The solar radius variations and its effects on the Earth climate are still a long scientific debate. The observed variations from ground experiments were not totally admitted and several space missions have had these measures as a goal. The high angular resolution of radius measurements and its long-term trend is however a challenge in space. The first attempts with MDI (Soho) then SODISM (PICARD) and HMI (SDO) revealed the difficulties of such measures due to the hostile environment which introduces thermal variations on the instruments all along the satellite orbit. These variations have non-negligible impacts on the optical properties of the onboard telescopes and therefore on the images and the parameters which are extracted such as the solar radius. We need then to make a posteriori corrections using the thermal housekeeping's recorded together with the data science. We present here how we make such correction on the solar radius obtained from the HMI images. We will then compare and discuss the results with the solar radius recorded at 607 nm with the ground-based instrument of PICARD.