

Luminance Measurements For Light Pollution Assessment

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Abstract—Light pollution is a phenomenon that needs to be closely monitored. There are currently many SQMs (Sky Quality Meters) that monitor the visibility of stars, but the method has the disadvantage that it does not eliminate the effect of humidity, clouds or aerosols. Another global assessment method uses ISS images that provide detailed information but cannot identify and locate the pollution sources. There is a need for a method accessible to the general public, which can measure the sources of light pollution. Using DSLR to measure luminance is a solution. There is information in the literature about the calibration of these devices to measure luminance, but the method nevertheless did not get wide spread. An identified problem is the photo camera's constant, which is shown to be, in fact, a conversion function. To overcome this limitation, the author presents the practical details that allow the rapid calibration of the DSLR using a single luminance standard for the entire measurement range. For practical measurements, it is indicated how the exposure latitude should be interpreted for extreme values of luminance. For the interpretation of the results, one uses general software environments, like MATLAB. The quantitative interpretation of the luminous field is thus a powerful and useful tool, far superior to the qualitative assessment currently possible. This is a change in strategy, from measuring the effect to measuring the sources of light pollution.

Keywords—DSLR calibration, field of luminance, source of light pollution

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