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Assessing the local hemispheric spectral sky artificial radiances contribution and sensitivity from different parts of a territory

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Abstract

In this paper, we suggest to use an artificial sky radiance numerical model which account for heterogeneous distribution of light fixtures, their photometry, the satellite derived ground reflectance and topography and atmospheric optical properties to infer the point to point contribution of a given territory to the artificial sky radiance at specified observer position and viewing angles. During the past few years, the model have been validated with many *in-situ* hyper spectral sky radiance measurements experiments (e.g. Canary islands European Northern Observatories, Spain in 2010, US Naval Observatory, AZ USA in 2006, etc.) The model aims to identify and characterize zones at which any lighting level increase or decrease may have a larger impact on light pollution and then help to control and/or reduce light pollution levels. This innovative methodology can be seen as a high level decision tool to help local authorities to restrict or reduce light pollution unwanted impacts. Among possible application it can be used 1) to protect research class astronomical sites, 2) to constrain potential impact on human/animals health and more specifically on potential circadian cycle disruption, 3) to reduce night time induced photosynthesis on vegetation canopy, and 4) restrict unnecessary power loss from over illumination and light trespass and its impact on climate change. The model is mature for enabling public access to its results. We recently launched online interactive georeferenced model output maps. The web portal allows an easier data access and exploitation/analysis by end users from research community or civil society.

Biography

Martin Aubé got his Ph.D. degree in remote sensing from Université de Sherbrooke, Canada and a M.Sc. degree in astrophysics from Université Laval, Canada. He is a Professor at Cégep de Sherbrooke physics department, where he is researcher/coordinator of GRAPHYCS research group. He is Associate Professor of the applied geomatics department at Université de Sherbrooke. Among many other affiliations, he is associate researcher at Centre d'applications et de recherche en télédétection (CARTEL), adjunct researcher at the Centre de recherche en astrophysique du Québec (CRAQ), and a member of the Global Environmental and Climate Change Center (GEC3).