

Abstract: NeSA202100oral-13: Global gridded GDP products: A review of uncertainties and fitness-of-use

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Gross domestic product (GDP) is one of the most useful and widely used indicators to measure economic development. Spatially explicit gridded data products are an increasing area of research with applications in fields ranging from development activities, humanitarian crises, natural disasters, pollution monitoring to policy making at local, national and regional levels. Gridded GDP products help to understand the socio-economic dynamics in these different applications when combined with other spatially-explicit gridded products such as population, emissions, agriculture, and precipitation among many. This paper focuses on a systematic review and comparison of the most comprehensive gridded GDP data products available to date by discussing them through qualitative and quantitative methods. It focuses on analyzing their underlying approaches and input data to determine their goodness-of-fit and to fully understand the characteristics of the products. This paper's goal is to help the data user community make informed decisions on the appropriateness of selecting a particular dataset for their set of applications and analysis. We found that the GDP data products show their differences coming fundamentally from the underlying gridded population datasets that they use. Analyzing case studies for the United States and India (scenarios of highly developed and rapidly developing nations), we found interesting results on how the datasets behave and how accurately they predict the GDP estimates in accordance to national statistics. Furthermore, in contrast to gridded population datasets, use of auxiliary variables apart from population count itself is negligible and we believe that could significantly increase the accuracy of the data products.

Keywords: gridded GDP, uncertainty, fitness-of-use, global