Geographic Information Displays for effective and efficient reasoning and decision making

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The scientific discipline of cartography offers a solid body of principles, theories, and methods to construct attractive-looking static 2D map displays to effectively and efficiently communicate geographic information. Alongside recent digital innovations cartographic practices have been extended to highly interactive human-computer interfaces to depict and explore rapidly growing and dynamically changing spatio-temporal databases for solving pressing societal and environmental problems including global climate change. However, there still has been little empirical research and fundamental investigations to inform practitioners as to why and how map designs or visual analytics displays work, and if they do, for whom, and in which use contexts. To this day, we still know little about the effectiveness of graphic displays for exploratory space-time data analysis, problem solving, knowledge exploration, learning, decision-making and communication of geographic phenomena and processes.

I report on recent empirical, theory-driven and evidence-based progress and future opportunities for designing and developing cognitively and perceptually affective, effective, efficient and responsive geographic information displays. Carefully designed graphic displays are necessary for the rapidly evolving information society to effectively and efficiently access geographic information, and to make informed and meaningful spatio-temporal inferences and decisions to address complex environmental and societal challenges.