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An analysis of socio-economic impact of fire modeling and fire detection data

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We examine the impact of earth observations, in particular satellite fire detections, and simulations on firefighting decisions. The coupled fire-atmosphere model WRF-SFIRE is executed for multiple possible scenarios. Each scenario, defined by experienced incident commanders, is driven by a different set of input data and may result in different decisions in terms of the allocation of firefighting resources. The firefighting decisions for each scenario are implemented into the coupled fire-atmosphere model, which simulates fire progression. The spatial evolution of the fire, combined with the comprehensive dataset of locations and values of assets, enables estimating a monetary value for the losses associated with each scenario. The differences between them and the actual base case can be then used to estimate the value of information for datasets acting as cues informing and driving firefighting decisions.

We illustrate how such a methodology can be used in the case of a large fire event, the 2011 Las Conchas fire. We present the results of a pilot analysis of the socioeconomic impacts of earth observations on the firefighting decisions at a selected decision point, and the resulting fire evolution. We also comment on the limitations of such an approach.

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