

CIPCast Decision Support System for Enhanced Risk Management of Heat Waves Affecting Roadways

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Abstract:

The CIPCast Decision Support System, developed within the EU MULTICLIMACT project, is a comprehensive platform designed to monitor, detect, and respond to various natural hazards, including earthquakes, floods, and heatwaves. By integrating multiple data sources, such as real-time meteorological data, GIS information, and UAV video feeds, CIPCast enables the assessment of critical infrastructures (CIs) and provides robust support for risk evaluation and management. This CIPCast software architecture facilitates real-time data processing and scalable decision-making, assisting urban planners and local authorities in responding efficiently to natural hazards. A particular focus of CIPCast is its ability to assess risks related to extreme heat events, specifically concerning roadways. By combining data on asphalt grade, temperature forecasts, and road maintenance status, CIPCast simulates the potential degradation of road surfaces under various thermal conditions. The system produces risk maps that depict the possible damage to roads based on current weather forecasts, as well as long-term projections using 30-year annual maximum temperature projections. This methodology allows for the identification of vulnerable infrastructure and provides insights into the future impact of heatwaves on roadways, supporting both short-term and long-term decision-making. The case study presented in this paper applies the heatwave risk assessment methodology to the road network in the Marche region, demonstrating how CIPCast can help infrastructure managers assess the risks posed by extreme heat and guide the development of adaptation strategies.