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Integrating Copernicus Seasonal Forecasting Data with CLIMADA for Heat Wave Impact Analysis: Challenges and Solutions in Pipeline Development

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Employing seasonal forecasting in the domain of impact and risk assessment is particularly beneficial. It facilitates early warning systems and proactive adaptation strategies, which are essential for minimizing the adverse effects of heat waves. This proactive approach is crucial for public health, urban planning, and disaster management, where timely information can significantly alter response strategies and mitigation measures.

This study, we underscore the value of integrating high-quality climate data with impact assessment models. It demonstrates how bridging the gap between climate science and practical risk management can lead to more effective and informed decision-making processes in the face of climate change challenges.

In our study, we integrate Copernicus seasonal forecasting data with the CLIMADA platform, adopting a forward-looking approach to assess the potential impacts of heat waves on populations. This integration involved developing a bespoke pipeline to seamlessly bridge the gap between raw forecasting data from Copernicus and the analytical capabilities of CLIMADA, an ETH Zurich-developed tool for climate impact and risk assessment. The focus is not only on facilitating data integration but also on automating the processing and communication of results.

One significant aspect of this work is managing extensive datasets containing multiple simulations. To efficiently handle this, we implemented an automated system for data extraction, transformation, and loading. This is crucial in maintaining the integrity and usability of the data within CLIMADA's impact modeling framework. Part of this process also entailed resolving spatial and temporal alignment issues, a step essential to ensuring the ability of the seasonal forecasting data to reflect the potential heat wave impacts. Our approach aim to streamline the complexities of large-scale climate data, enhancing the precision and effectiveness of our assessments.

Building a pipeline that links these probabilistic forecasting with impact assessment tools has multiple benefits. It enhances the capability to identify critical data needs and model improvements, thus fostering a feedback loop that drives data and model refinement. Furthermore, it contributes to laying the groundwork for the effective use of the next generation of seasonal forecast data, potentially transforming how we prepare for and adapt to climate risks.