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# Evolution of phenological and rainfall erosivity interactions for major Bavarian crops under climate change: Intra- and inter-annual C factor dynamics (1990-2020)

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Though climate change induces gradual shifts in mean temperature and annual precipitation, its most erosion-relevant impacts arise from disruptions to intra-annual patterns, including more intense rainfall events, prolonged droughts, and altered seasonal distribution. These changes modify crops phenology (e.g., accelerating or delaying growth stages) and prompting farmers to adapt their practices (e.g., earlier harvests, altered planting windows). Together, these changes could increase the susceptibility of cropping systems to erosion by misaligning vegetative cover with periods of increased erosivity. This study investigates the long-term evolution (1990-2020) of the USLE/RUSLE Cover factor (C factor) for major Bavarian crops (incl. wheat, barley, and maize; southern Germany), integrating high-resolution phenological data with radar-derived rainfall erosivity to assess climate- and management-driven changes in crop erosion sensitivity. Preliminary results indicate that while annual C factors remain relatively stable, crop-specific phenological shifts and intra-annual precipitation volatility alter seasonal erosion sensitivity. These findings highlight the relevance of dynamic C factor approaches for erosion modelling - integrating real-time cover development and rainfall erosivity - to improve model reliability and better inform climate-adaptative farming and soil conservation strategies.