

Meteorologically-Informed Spatial Planning of European PV Deployment to Reduce Multiday Generation VariabilityDirk Mühlemann¹, Doris Folini¹, Stefan Pfenninger², Martin Wild¹, Jan Wohland^{3,4}¹ Institute for Atmospheric and Climate Science, ETH Zurich, CH-8092 Zurich, Switzerland² Faculty of Technology, Policy and Management (TPM), Delft University of Technology, Delft, The Netherlands³ Institute for Environmental Decisions, ETH Zurich, CH-8092 Zurich, Switzerland⁴ now at: Climate Service Center Germany (GERICS), Helmholtz-Zentrum Hereon, Hamburg, Germany**Contents of this file**

Figures S1 to S5

Introduction

We here present five figures which either give some additional information (Figure S1), a slightly different perspective (Figure S2 and S4) or a more detailed overview (Figure S3 and S5) to the results and figures presented in the main paper. All scripts and data sources to reproduce the figures are available in the Data Availability Statement of the main paper.

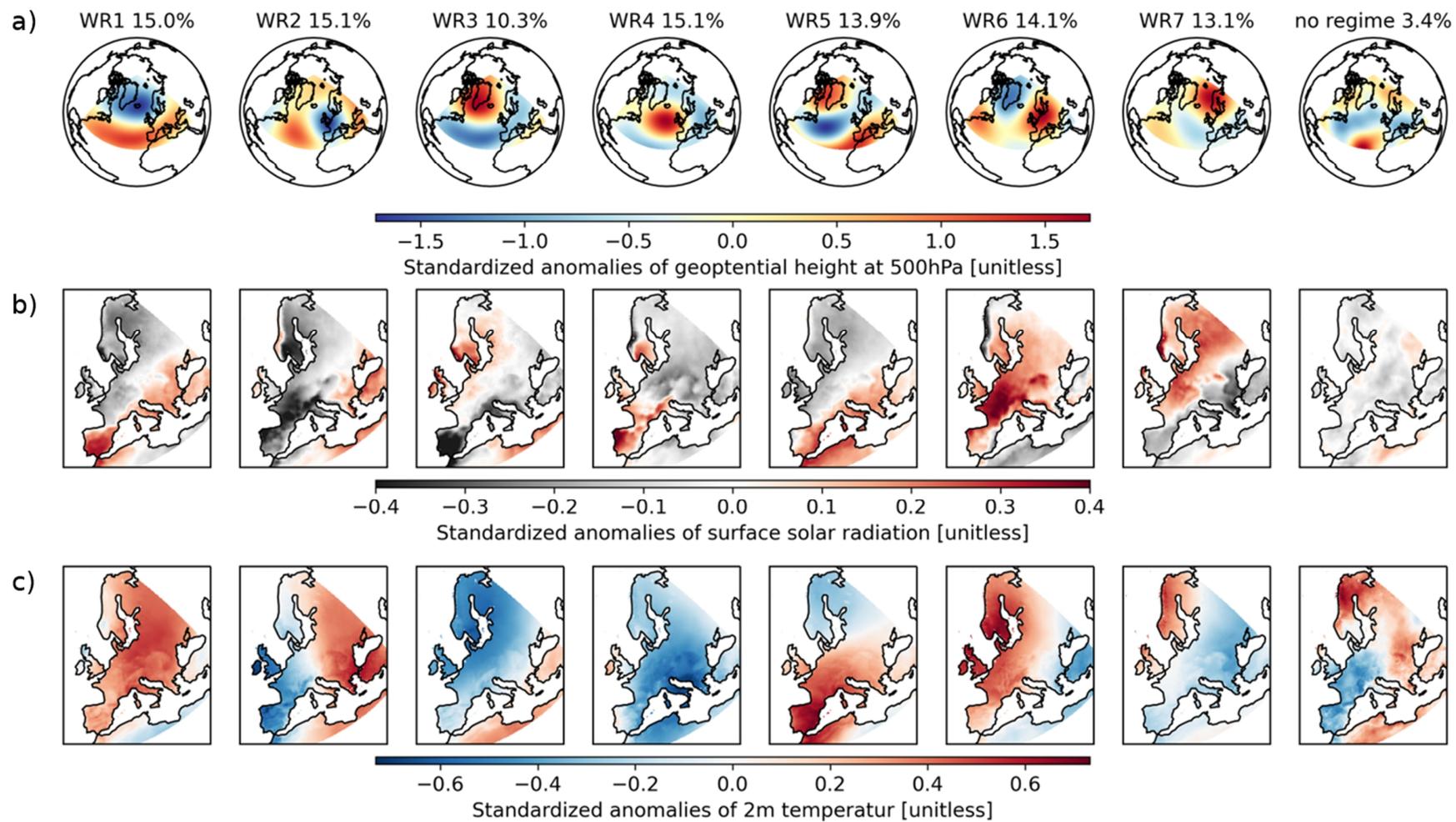
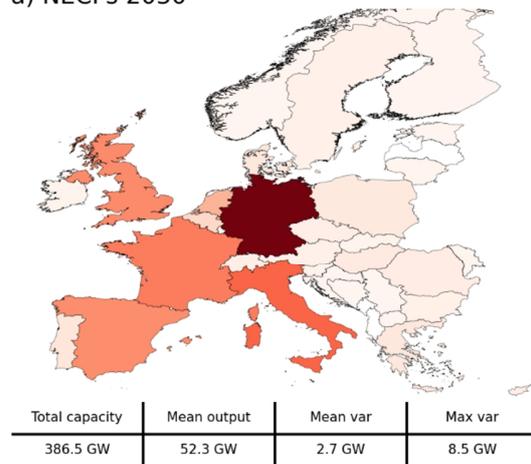
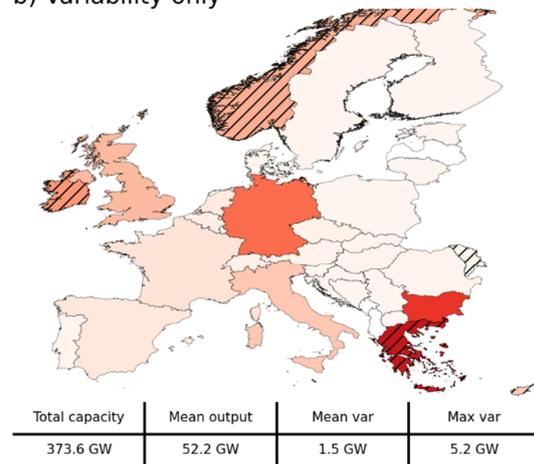


Figure S1. Anomalies related to the derived seven weather regimes and “no regime”. a) Standardized anomaly fields of geopotential height at 500 hPa plus their frequency of occurrence. b) Standardized anomaly fields of surface solar radiation. c) Standardized anomaly fields of 2m temperature

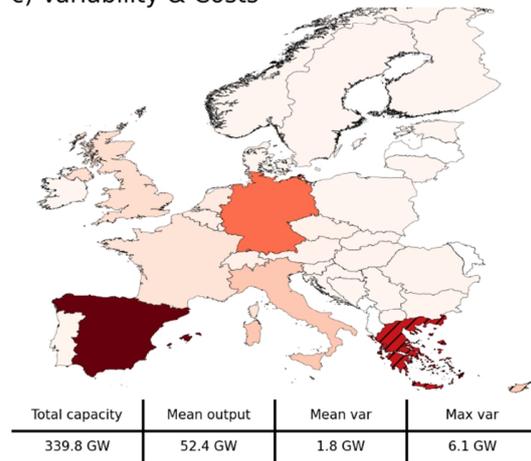
a) NECPs 2030



b) Variability only



c) Variability & Costs



d) Variability & Autarky

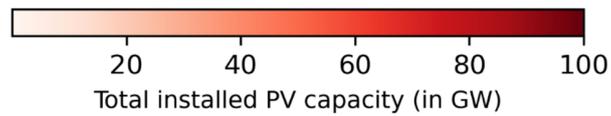
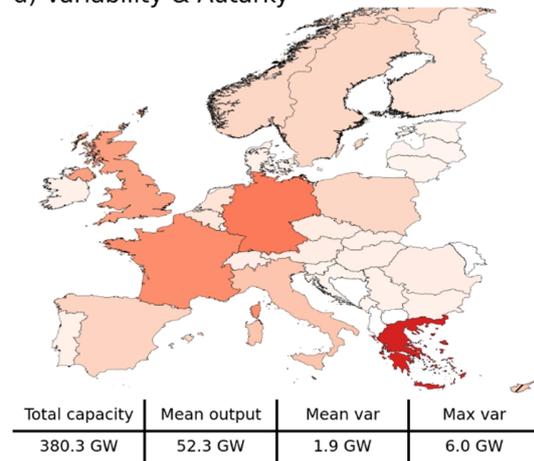


Figure S2. Absolute installed PV capacity distributions planned for 2030 (NECPs) and resulting from the three scenarios "Variability only", "Variability & Costs", and "Variability & Autarky". Hatched countries indicate that the upper bound (potential for roof-top mounted PV systems) is reached.

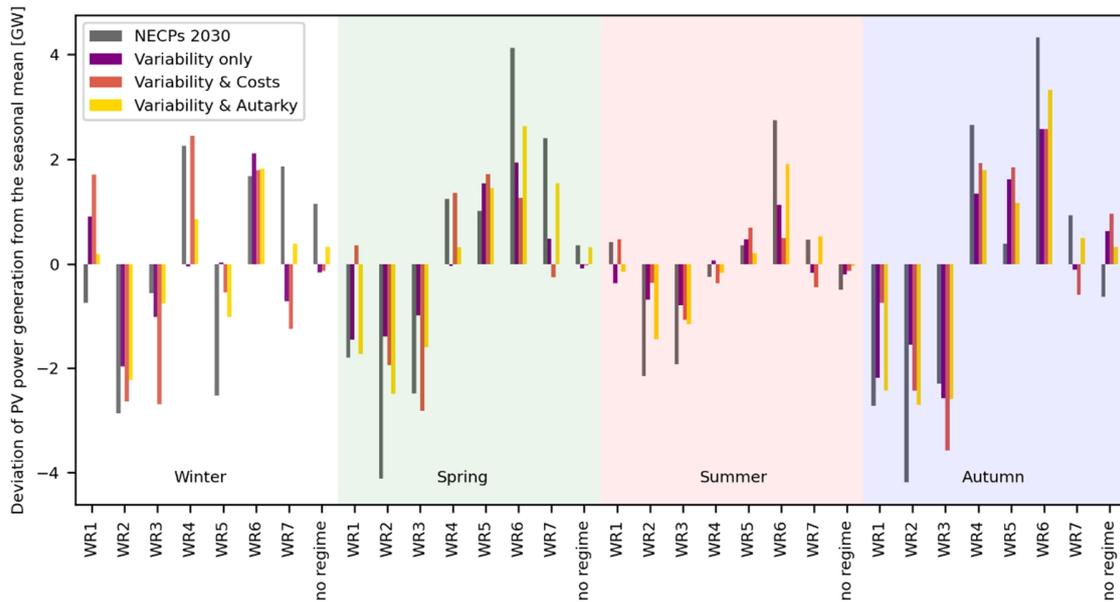
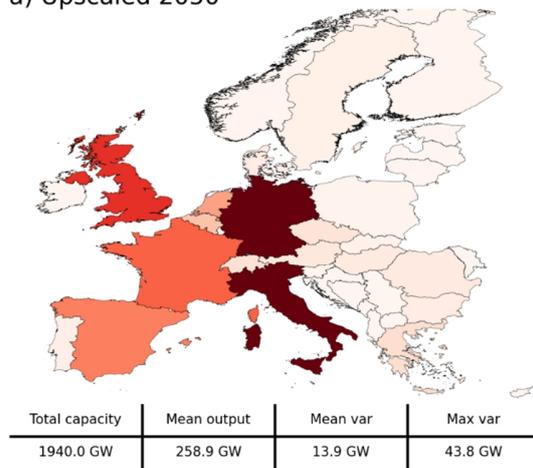
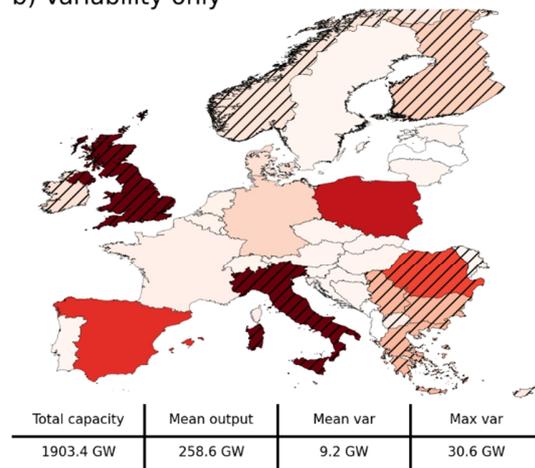


Figure S3. Deviation of PV power generation from the seasonal mean per weather regime and season. In grey, the estimated deviation with the planned installed capacities for 2030 (NECPs) and in colour the estimated deviation with the installed capacity distribution for scenario "Variability only", "Variability & Costs" and "Variability & Autarky", respectively.

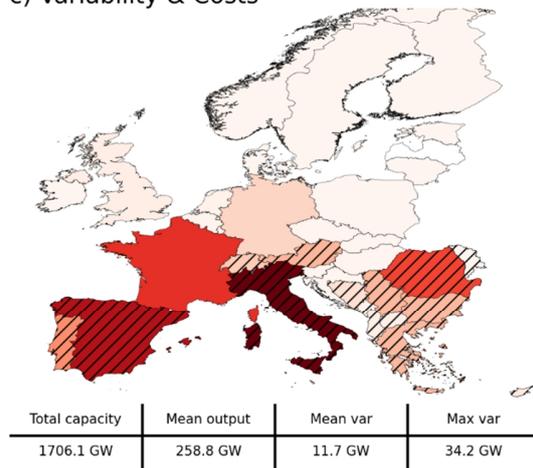
a) Upscaled 2050



b) Variability only



c) Variability & Costs



d) Variability & Autarky

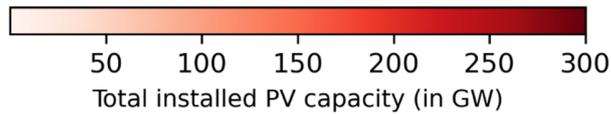
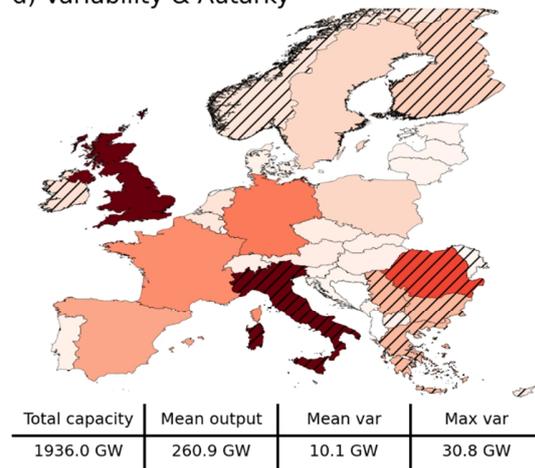


Figure S4. Absolute installed PV capacity distributions upscaled for 2050 and resulting from the three scenarios "Variability only", "Variability & Costs", and "Variability & Costs", "Variability & Autarky". Hatched countries indicate that the upper bound (potential for roof-top mounted PV systems) is reached.

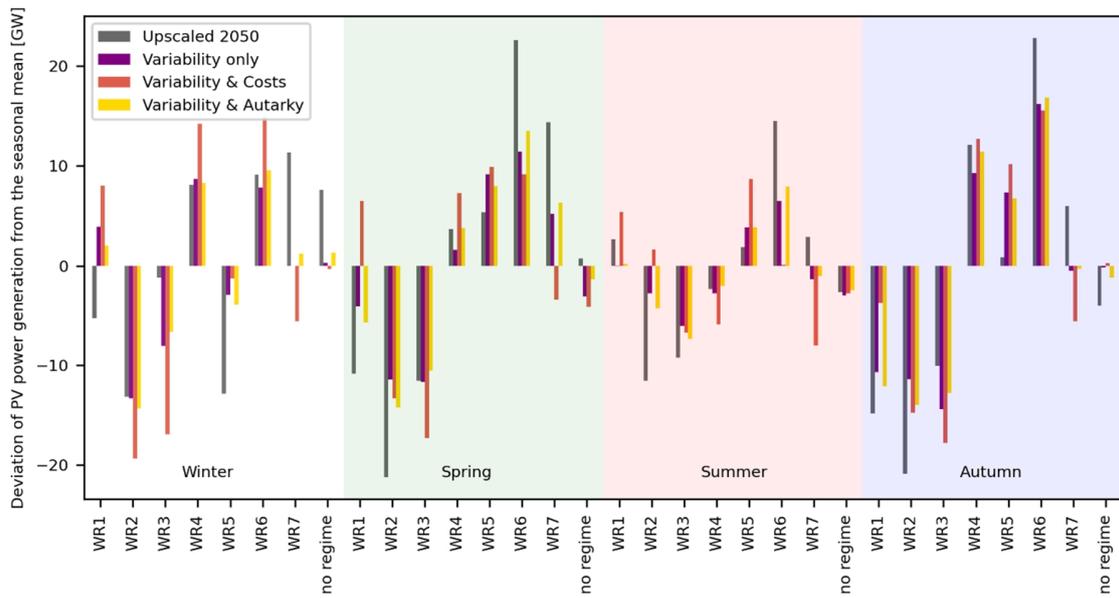


Figure S5. Deviation of PV power generation from the seasonal mean per weather regime and season. In grey, the estimated deviation upscaled for 2050 and in colour the estimated deviation with the installed capacity distribution for scenario "Variability only", "Variability & Costs" and "Variability & Autarky", respectively.