Alfie McGlennon

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SUMMARY

MSc Climate Change and AI student at the University of Reading, with a BSc in Meteorology and Climate. Experienced in analysing large-scale climate datasets (ERA5, CMIP6, Berkeley Earth) using Python, and in applying machine learning and statistical methods to climate risk, compound extremes, and energy systems.

SKILLS

Core analytical and data	Data analysis and preprocessing, Time-series analysis (multivariate, seasonal data), Statistical analysis and anomaly detection, Copula-based dependence modelling, Quantitative and predictive modelling
Climate and environmental data	Climate data analysis (gridded datasets, reanalysis, projections), ERA5, CMIP6, UKCP18, GloFAS, HadCET, HadCRUT5, Berkeley Earth, DestinE, Climate anomalies, trends, and extremes, Compound event risk assessment, Interpretation of large-scale atmospheric circulation patterns
Programming and tools	Python (pandas, NumPy, xarray, matplotlib, seaborn, scikit-learn, scipy), JavaScript/TypeScript, HTML/CSS, Bash, SQL, Data visualisation (D3.js, Power BI, DAX, Streamlit), Git, JupyterLab, LaTeX, Obsidian
Machine learning and AI	XGBoost, scikit-learn, Stable Baselines3 (PPO), PyTorch (LSTM), PennyLane (quantum ML), Feature engineering (temporal, categorical, cyclical, circulation-derived), Model interpretation (SHAP, Fourier decomposition), SLURM (HPC job scheduling, University of Reading RACC cluster)
Web and deployment	React, Leaflet, WebAssembly, Astro, MDX, GitHub Pages

PROJECTS

GB Grid Scenario Tool (JavaScript, React, WebAssembly, Python, SB3, ERA5) *2025-2026*
alfiemcglennon.github.io/gb-grid-tool

- Built a browser-based DC power flow model of the GB transmission network from public NESO data.
- Implemented three dispatch modes including LP-optimal dispatch using HiGHS compiled to WebAssembly.
- Validated B6F boundary flow to within 2% of NESO published ETYS transfer capabilities.
- Trained PPO reinforcement learning agents on 9 years of real generation, demand, and weather data.
- Agents achieved dispatch costs within 6% of real grid operations through iterative reward design.
- Compared MLP, CNN (72 ERA5 weather channels), and 27-zone zonal architectures on the RACC HPC cluster.

Quantum ML for Atmospheric Regression (Python, PennyLane, ERA5) *2026*

- Experimenting with variational quantum circuits on ERA5 temperature field regression.
- Exploring per-qubit Fourier decomposition as an interpretability tool for structured VQC regression. Ongoing.

Climate Data Quickstart (Python, Streamlit, xarray, cdsapi) *2026*
github.com/AlfieMcGlennon/climate-data-quickstart

- Built an open-source desktop app and script library covering 19 climate datasets across five categories.
- Includes ERA5 variants, CMIP6, HadCET, UKCP18, GloFAS, and ECMWF Open Data.
- Streamlit interface for downloading and exploring data with cross-platform setup scripts.
- Built using a three-stage agentic pipeline: schema extraction, code generation, API validation.

City Climate Bars and Stripes (HTML, JavaScript, D3.js, Berkeley Earth) *2025*
alfiemcglennon.github.io/city-climate-stripes

- Built an interactive browser-based temperature anomaly visualisation for 6,000+ cities, 1850 to present.
- Annual and seasonal views, two baseline periods, three colour scaling modes, PNG export.
- Entirely client-side, single index.html file, ~230MB of Berkeley Earth data.

Climate Playbook (Astro, MDX, D3.js) *2025-2026*

- Designing an interactive climate education platform for UK schools, Key Stage 1 through Key Stage 5.
- Modular lessons with interactive figures showing climate mechanisms rather than static diagrams.
- Informed by research into the National Climate Education Action Plan and teacher pain points.
- In progress, not yet publicly visible.

Electricity Demand Forecasting, India (Python, XGBoost, PyTorch, ERA5) *2026*

- State-level electricity demand prediction using ERA5 weather variables.
- Implemented linear regression, XGBoost, and LSTM with temporal cross-validation.
- Per-state R-squared choropleth revealing geography of weather-driven vs non-weather demand.

EDUCATION

MSc Climate Change and Artificial Intelligence, *University of ReadingReading, UK* *2025 to 2026 (expected)*

- Dissertation: Predicting Compound Heat Stress Risk in Europe using copula-based frameworks and ML-driven dependence estimation.
- Key modules: Applied Data Science with Python, Artificial Intelligence and Machine Learning, Climate Change Causes and Consequences, Data Science and Climate Services, Causality and Decision Making in Climate Change.

BSc Meteorology and Climate, 2:1, *University of Reading* *Reading, UK* *2021 to 2025*

- Dissertation: Investigating an Equilibrium Approximation for the Bowen Ratio (First Class).
- Key modules: Data Science and Climate Services, Numerical Modelling, Boundary Layer Meteorology.

A-Levels, *The Forest School* *Wokingham* *2021*

- Mathematics (A), Geography (A), Physics (B).

EXPERIENCE

Data Analyst Intern, *Safestore* *Borehamwood* *July 2024*

- Analysed customer data to identify behaviour trends and retention metrics.
- Used Python (pandas, matplotlib, seaborn) to create data visualisations supporting retention strategies.
- Delivered concise presentations to senior management.

Swim Teacher (Level 2), *Places Leisure* *Reading* *November 2020 to Present*

- Delivered structured instruction to students of all levels, adapting methods to diverse learning styles.
- Developed clear communication, patience, and management skills.

Lifeguard, *Places Leisure* *Reading* *August 2019 to Present*

- Worked as part of a team to maintain safety standards, respond to incidents, and support an inclusive environment.

VOLUNTEERING

Coach, *TVTristars Triathlon Club* *2018 to 2021*

Swim Instructor Support, *Bulmershe Leisure Centre and Reading Swim Club* *2016 to 2019*