

Geovisual Storytelling of Climate-Induced Migration Patterns in Urban Environments

Copernicus Master in Digital Earth-Diploma Thesis 2026

01 Goal Design a storytelling platform of maps and data visualisations presenting climate-driven migration trends, using Copernicus and related data sources.

- I 18 map outputs across two contexts: slow-onset migration in urban Europe (2015–2024) and rapid-onset displacement in southern Malawi after Cyclone Freddy (2023).
- II One website-based storytelling platform, sequenced and annotated for urban planners and policy makers.
- III Examine, descriptively, whether climate stress aligns spatially and temporally with migration without asserting causation.

02 Methods and Workflow

Data: Copernicus (Climate Data Store & Land Monitoring Service), Census Grid, Eurostat, ARDECO, IOM/OCHA, Sentinel-2. Software: ArcGIS Pro (primary), QGIS, Canva, GitHub, Google Forms.

Wurman dots Hexagon climate-stress grid Bivariate dot-density Choropleth typology Flow map Bivariate susceptibility

One visual vocabulary within each case, with a deliberate register shift between the Europe and Malawi suites so, one guided story, two distinct phenomena.

Cartographic approach: The platform applies more than ten cartographic and chart-based techniques across 18 maps: Wurman dots for population, a bivariate hexagon grid for climate stress, a ten-year choropleth series and a country typology for migration, and a flow map and susceptibility matrix for Malawi. Each map also carries a matched chart.

Design system: One shared vocabulary of colour, typography, and layout holds each case together, while a deliberate register shift between the calm Europe suite and the warmer Malawi suite marks slow-onset and rapid-onset displacement as different phenomena.

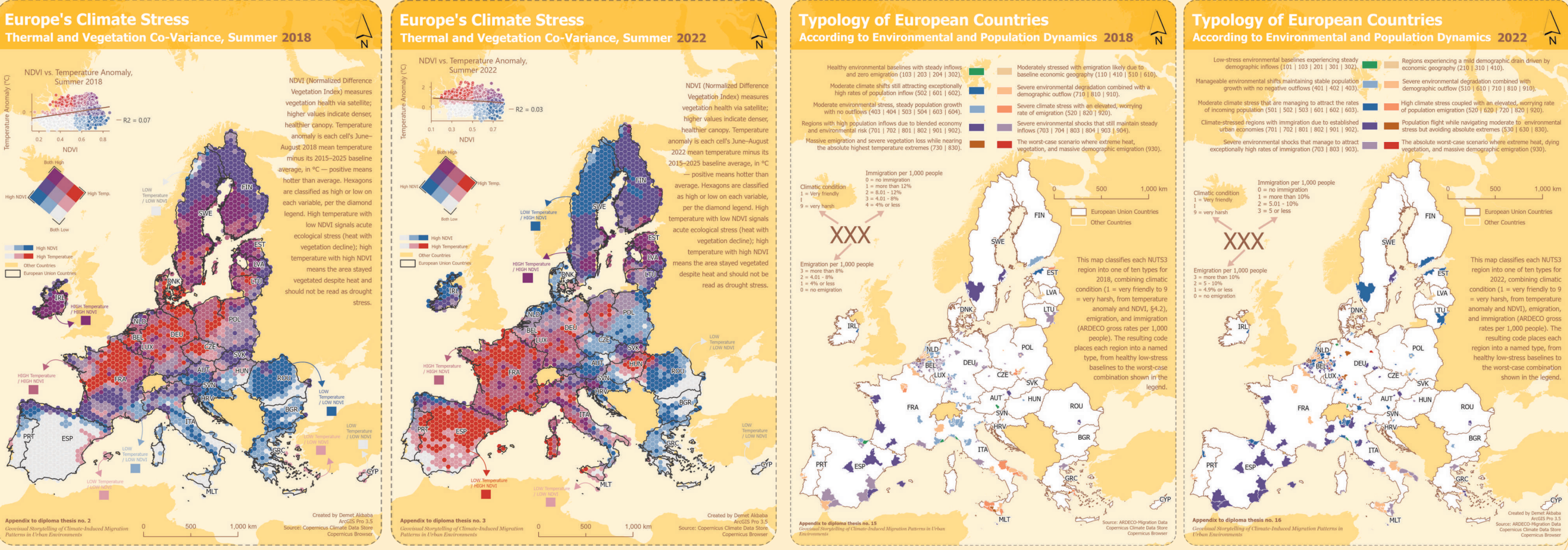
Quality assurance: Six validation checks were run across the two cases; three confirmed the outputs and three caught processing errors that were corrected.



03 Results

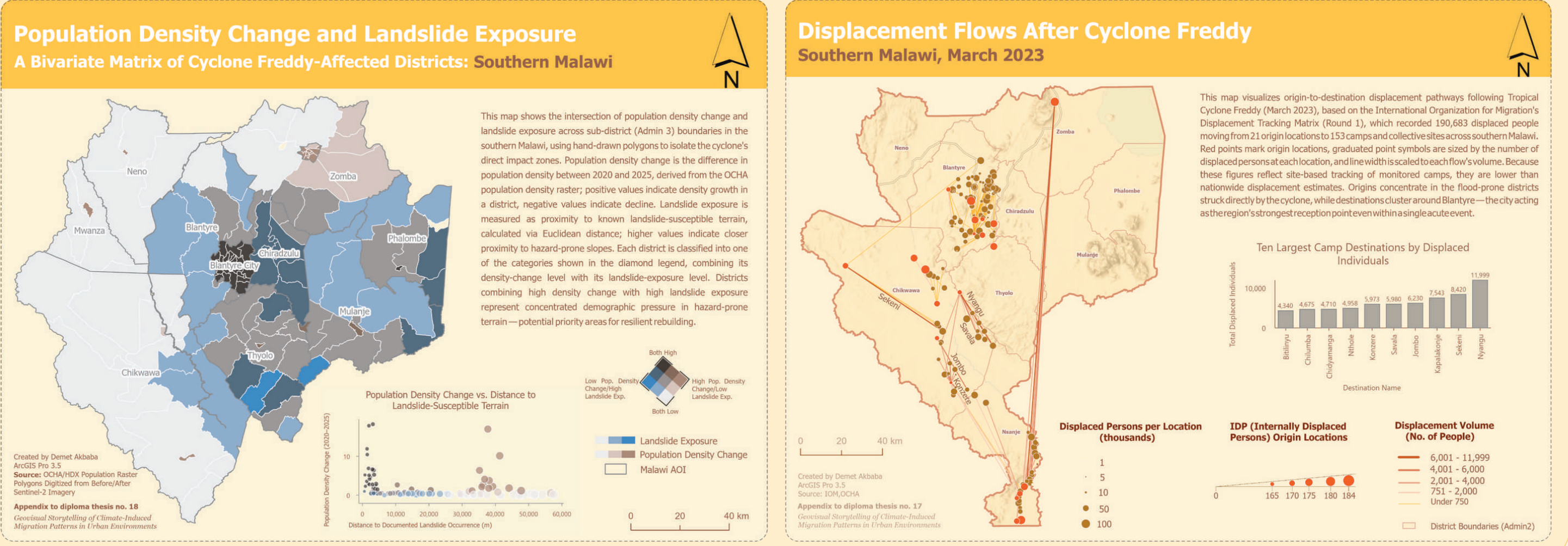
EUROPE: SLOW-ONSET MIGRATION (2015–2024)

Outgoing migration does not rise in the same year as the 2018 or 2022 drought shocks. A delayed rise appears only in 2019–2021 (German urban regions), but this overlaps with COVID-19 and cannot be attributed to climate stress with confidence. The country typology shows the severe-stress regions in Spain and, by 2022, France remain immigration destinations even as their climate worsens.



MALAWI: RAPID-ONSET DISPLACEMENT (2023)

Displacement origins concentrate in the flood-prone districts struck by Cyclone Freddy; destinations cluster tightly around Blantyre, the city acting as a pull factor within a single acute event. Demographic pressure and landslide risk co-occur almost exclusively in Blantyre's informal hillside wards.



Central result : Urban exposure to climate-induced migration is not one phenomenon but at least two, depending on whether the city sits downstream of, or directly within, the climate event's footprint.

04 Contribution of the Work

This thesis contributes a sub-national, dual-pace (slow-onset vs. rapid-onset) geovisual storytelling platform, built from more than ten complementary ArcGIS Pro cartographic techniques, that shows where climate stress and migration patterns do and do not align for planning and policy audiences, without claiming a causal relationship. Three things distinguish it: it is a storytelling platform, not a dashboard (unlike IOM's Climate Mobility Dashboard); it is visualization-heavy (10+ techniques in one platform); and it compares one storytelling approach across two structurally different displacement contexts.