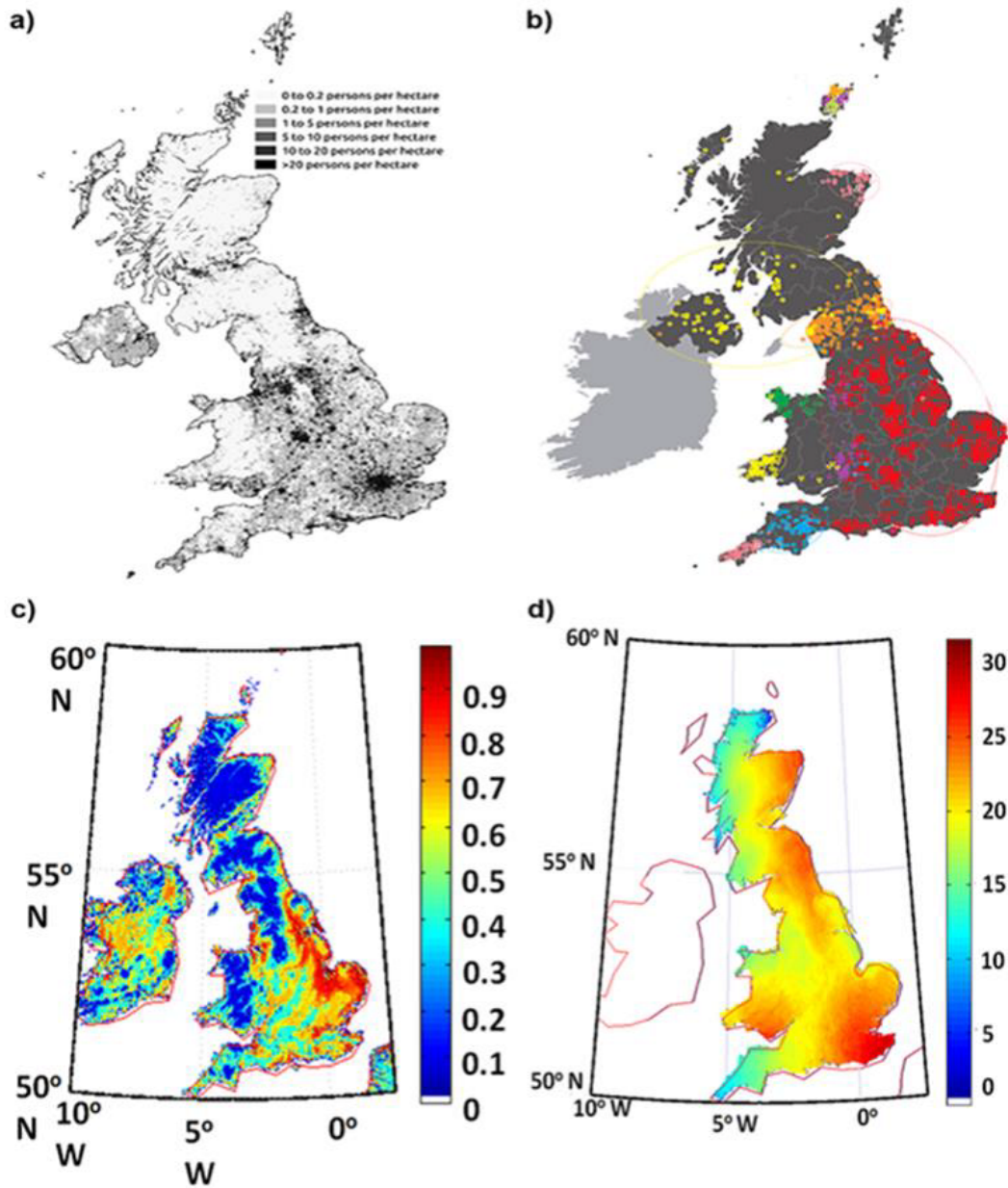


Simulation of prehistoric population dynamics using current topographical satellite data

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This image shows a) the current British population density, b) the genetic map, c) the habitability of the landmass, and d) simulated distribution in population after 2,000 steps. Credit: Mayank N. Vahia, Uma Ladiwala, Pavan Mahathe, and Deepak Mathur

In a recent breakthrough, scientists from the Tata Institute of Fundamental Research, and the Centre for Excellence in Basic Sciences, Mumbai, demonstrate an accurate method to simulate prehistoric movements of people based upon current topographical satellite data. Recently published in the journal *PLOS ONE*, population dynamics of prehistoric human migration into the island comprising England, Scotland and Wales was simulated by applying a diffusion equation tempered by geographical data determined from satellite-based information.

Importantly, these findings are validated by recently-available genetic data. This method may prove useful in determining early human [population dynamics](#) even when no genetic information is available.

Movement of people in prehistoric times was almost entirely determined by geography and human needs, both deterministic parameters when small populations move into unoccupied areas where conflicts and large group dynamics are not important. The early period of [human migration](#) into the British Isles provides a near-ideal laboratory which, because of its relative geographical isolation, may allow some insights into the complex dynamics of early human migration and interaction.

Commenting on the simulation used in this study, Professor Vahia, the lead scientist of this work, says, "Our simulation code is based on human affinity to habitable land, as defined by availability of water sources, altitude, and flatness of land. These parameters temper the diffusion of people and allow us to follow their path of migration." The initial entry points of people into the main British island were determined using data from the megalithic period. Topographical and hydro-shed data from satellite databases was used to define habitability, based on distance from water bodies, flatness of the terrain, and altitude above sea level.

Population movement was simulated based on assumptions of affinity

for more habitable places, with the rate of movement tempered by existing populations. The team of scientists compared the results of their computer simulations with available genetic data to show that their simulation can predict fairly accurately the points of contacts between different migratory paths. Such a comparison also provides more detailed information about the path of peoples' movement over ~2000 years before the present era.

More information: Mayank N. Vahia et al, Population Dynamics of Early Human Migration in Britain, *PLOS ONE* (2016). [DOI: 10.1371/journal.pone.0154641](https://doi.org/10.1371/journal.pone.0154641)

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