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Hydroclimatology and Comparative Soil Erosion in Eastern North America and Western Europe

Stanley Trimble
University of California, Geography, Los Angeles, California, United States (trimble@geog.ucla.edu)

Extreme soil erosion and hydrologic disruption during the historical period of European agricultural occupance has been well documented for several regions of the US. Why was it so much more severe in the US than in Western Europe, the place of origin of most settlers? While choice of crops, agricultural practices, literacy, tenancy and economic factors were all contributing factors, differences of hydroclimatology, specifically rainfall intensities and amounts, also played a strong role. The climate of Western Europe is Marine West Coast (Koeppen:Cfb)while that of Eastern North America is Humid Subtropical or Humid Continental(Cfa, Dfa). While both regions are humid, Western Europe tends to have well-distributed rainfall occurring in moderate storms whereas Eastern North America has more erratic rainfall occurring in often intense storms. A comparison of long-term frequency-magnitude relationships of storms shows much lower values for Europe than for America. For example, a 100-year-24 hour event in the southeastern US is about 2-4 times as great as that in lowland England. European settlers simply did not have the agronomic and engineering techniques to deal with this excessive rainfall and such techniques were not developed in he US until the 1930s. . Agricultural fields in Britain generally require no engineering such as terracing, contour strip cropping, or even contour plowing to handle excess water but they are absolutely required in the eastern US. There is evidence that climate change will affect these features. For example, intense rainstorms in southern England in recent years have flooded roads (because the drains were inadequate), eroded fields (no conservation measures), and flooded villages (storm channels were too small).For future projects, Europeans may well have to look to the engineering practices developed and used in the eastern US.