

Cartography, Electoral

William Durkan, Adrian Kavanagh, and Caoilfhionn D'Arcy, Department of Geography, The National University of Ireland, Maynooth, Maynooth, Ireland

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Glossary

Cartogram A map that represents different regions not according to their land areas, but according to some other thematic mapping variable, such as population, thus distorting the shape of these regions to take account of other variables.

Electoral Geography A branch of geography, within the subdiscipline of political geography, which is especially concerned with studying the geographical dimension of electoral results, as well as of how elections are organized and conducted.

Gerrymandering The practice by which the shape and size of electoral boundaries is deliberately changed to benefit one political grouping (usually a governing party) at the expense of others.

Geographically Weighted Regression Technique for exploratory spatial data analysis, which allows for the measurement of spatially varying relationships (thus showing how relationships between the dependent and predictor variables might vary over space).

Géographie Électorale Early work in the field of electoral cartography and geography carried out in France in the early 1900s and particularly associated with French geographer, André Siegfried.

Marked Register Turnout Figures Turnout figures calculated, usually for very small areas, based on the study of the marked electoral registers used in specific electoral contests, thus addressing the dearth of small-scale electoral data that emerges in places where such data are only available for (relatively large) constituency units. Such figures may be calculated to the level of the smallest areal units used for the purposes of census returns (such as electoral divisions, in the case of the Republic of Ireland).

Open Source GIS Open source GIS places a focus on free and open access, modification, distribution, and active community support for the cartographic software.

Packing A term used with regard to the process of altering constituency boundaries to group large numbers of supporters of a given party in an area, far beyond the required threshold for electoral success, in order to negate their influence elsewhere.

Purple States A term used in the US to define key swing states in election contests. These states are often the most competitive, tending to vary in terms of party support between electoral contests, and as such, can neither be classed as a Democratic (Blue) or Republican (Red) stronghold.

Redistricting Term particularly associated with American politics, mainly involving the making of changes to the boundaries of election constituencies, usually in order to take account of population change within a state as identified in the publication of census reports. In states such as the Republic of Ireland and the United Kingdom, independent commissions take responsibility for the redrawing of election boundaries, whereas in other states, this responsibility may lie in the hands of government politicians, a factor that may give rise to the practice of gerrymandering (see earlier).

A key field within electoral geography, electoral cartography is concerned with mapping the various factors that are associated with elections, including election results (both in terms of support and representation levels), voter turnout levels, and party mobilization efforts. Studies within the areas of electoral cartography and electoral geography highlight the key role of geography in elections; stressing that voters do not express their preferences within a vacuum, and that political decision-making processes are influenced, to varying degrees by the contexts—national, regional, and local—with which such processes are inserted. Electoral cartography ensures that a spatial, or contextual, viewpoint remains central to studies of electoral participation, voter choice, and the operation of electoral systems, and stresses that place matters in those processes.

Exploratory spatial data analysis techniques allow researchers to identify spatial patterns in different data sets and, based on these observations, to formulate hypotheses, based on the geography of the observed patterns. The exploratory nature of the practice implies that electoral cartography should be a starting point for electoral geography research, before applying other quantitative and qualitative techniques to test the emerging hypotheses with reference to various causal factors. The mapping of electoral patterns formed the key focus of the earlier work within the discipline, as most notably associated with the French regional school and the “géographie électorale” of André Siegfried in the early 1900s. Siegfried’s research, as with many other subsequent studies in electoral geography, involved a technique of map comparison, wherein the degree to which the spatial patterning of election results for different French political parties could be associated with the spatial trends associated for other, causal, factors was studied.

Siegfried's 1913 classic study of voting trends in the Ardèche region of France was accused of being environmentally deterministic in nature, given that he associated particular voting patterns with different physical landscapes. The linking of the physical and political environments allowed Siegfried to highlight how different landscapes helped produce different socioeconomic conditions, which in turn acted to shape the political orientation of voters within the different French regions. Little work was carried out within the field of electoral geography (and electoral cartography) outside of France until the 1960s and the emergence of geography's quantitative revolution.

Newspapers in Europe and North America (as for example *The Times* newspaper in 1895) from the end of the 19th Century onward started to use maps and cartograms to illustrate different aspects of electoral contests to their readers. Since then, election maps have played a significant role in media coverage of election campaign and election results, and the increasing sophistication of the techniques being used has become readily apparent across recent election contests. Media outlets favor the use of maps because their viewers/readers like maps and trust maps. As well as reflecting electoral support and voter turnout patterns in electoral contests, maps may be used in media's election-night coverage as a means of predicting the final result nationally based on early vote returns from specific voting districts. Analysts may compare trends for the areas/constituencies returning their votes early with those of previous elections in order to tease out whether specific patterns, in terms of changing support levels, may be emerging. Election commentators can also look at past results in the areas/constituencies, which have yet to return results, as a means of predicting how the election results in those areas might pan out in the present contest and, subsequently, how the final results nationally might look. Election-night coverage for the 2016 US Presidential Election (Fig. 1), in which the use of maps and detailed analyses of voting patterns within specific areas in key swing states, figured prominently, was a very good example of how important maps are in terms of electoral analysis. Donald Trump would himself subsequently refer back to Election Day 2016 as "the incredible night with the maps", demonstrating just how pervasive cartography is in the context of modern election coverage.

The form that electoral cartography takes is often driven by its intended use. As people move away from traditional media formats as their main source of information in relation to an electoral contest, the mapping of elections also moves away from the traditional static format toward the interactive online experience. The process of interactive online mapping allows the end user to customize their own individual viewpoint as desired, in order to best explore the information of interest to them. In this sense, online interactive mapping tools offer a new cartographic experience, previously unavailable to the general public. Modern online interactive election mapping tools closely reflect the GIS (Geographical Information Systems) user interface, placing control of the commentary in the hands of the user, while still offering in-depth socioeconomic and demographic analysis where relevant. The example in Fig. 2, from a newspaper online interactive election map in 2016, allows the user to adjust the scale of analysis from the national state-wide picture to each individual county, with relevant socioeconomic and demographic statistics available at each scale.

Within the academic field of electoral geography, Siegfried's cartographic comparisons gave way to more statistically based techniques with the emergence of geography's quantitative revolution in the second half of the 20th Century. These studies were particularly concerned with voting cartographies, electoral boundaries, and the analysis of geographical influences on voting, including work on the neighborhood and friends and neighbors effects, as rigorous statistical analyses of how space impacts on electoral behavior replaced the earlier map-comparisons approach. With other branches of political geography, such as geopolitics, in decline during the 1950s, 1960s, and 1970s, electoral geography, with its large data bank of electoral statistics, proved to be particularly suited to the quantitative approach. Cartographical techniques still remained as a particularly powerful tool; for instance, maps of different outputs produced by the ecological models were often produced to complement the statistical analyses and to illustrate the key findings. Since then, new and highly sophisticated computer-based applications have added further dimensions to electoral cartography and to its applicability within practical politics. In recent years, a rapidly growing data deluge has provided a torrent of

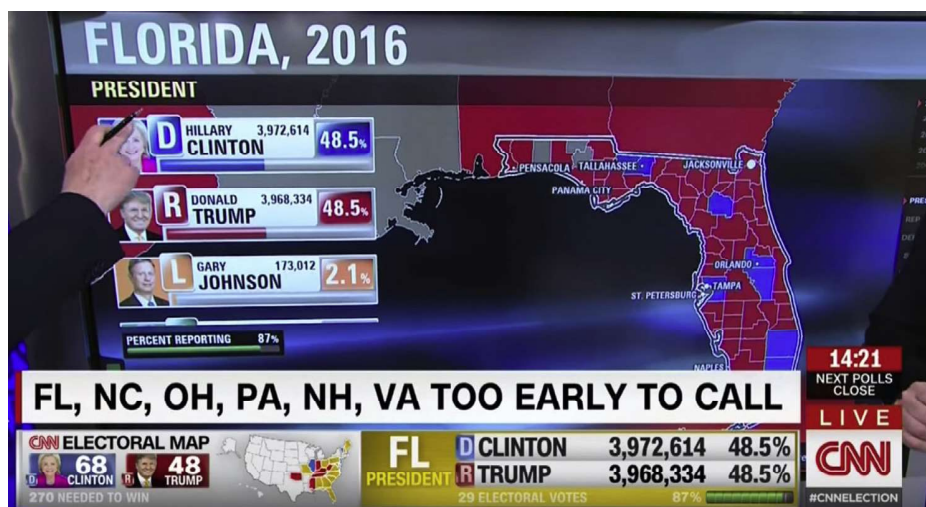


Figure 1 CNN Election-night coverage for the 2016 US Presidential Election, CNN (2016).

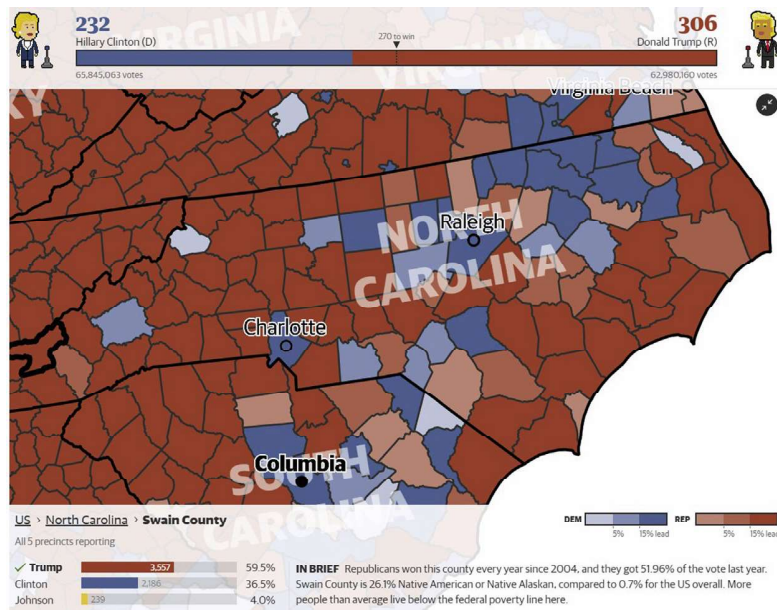


Figure 2 Interactive online map of the 2016 Presidential Election in North Carolina, US. The Guardian (2016).

geospatial data relating to many academic disciplines, and the field of electoral cartography is no different in this regard. The increasing availability of large volumes of geospatial data, combined with the latest cartographic technologies, leads to growing levels of complexity and sophistication within the mapping process. The development of geographically weighted regression techniques has added new dimensions to work within the area. The mapping of localized statistical outputs allows the reader to appreciate how relationships between various causal factors and electoral behavior may vary across space, thus illustrating how place, or local context, matters in terms of influencing how different factors relate to electoral behavior. The use of cartograms to display geographically based electoral figures has also added new dimensions to electoral cartography. The use of cartograms for the purposes of displaying US election results gives a more faithful presentation of the relative strengths of the Republican and Democratic parties. Conventional maps portray the US political space as dominated by the Republican support, due to this party's strength in the large, but low-density, interior states. By using cartograms to display electoral support levels, however, the sizes of US states (or counties) are rescaled based on population levels, thus placing greater emphasis on highly populated states where Democratic Party support is often higher. Cartograms are also useful in the context of the United Kingdom, where the dominance of the Conservatives in low-density, rural, constituencies means that this party's strength, especially relative to the more urban-dominated Labour Party, tends to be overestimated when conventional maps are used to display election results. Similar trends can be viewed in other states across the globe, in instances where one party is more dominant in highly populated urban areas and other parties are stronger in less densely populated rural areas; scenarios where cartograms would also prove useful in demonstrating relative levels of party strength.

The use of more sophisticated mapping programs has further increased the effectiveness of partisan gerrymanders, as evidenced in the results of Congressional elections in the US in the 2000s, with such practices contributing to more general trends of congressional incumbency protection and declining electoral competitiveness. Rapidly developing GIS technologies, combined with the growing availability of socioeconomic and demographic data, have altered the cartographic process of partisan gerrymandering in the US. This technology, which allows the representation and analysis of select demographics within a given electoral area, added a new depth to the process, resulting in revisions that serve to influence and shape electoral results. The application of modern GIS technologies to the redistricting process allows the identification, and potential manipulation, of spaces of underrepresentation. With census data and GIS more accessible due to improving technology, people employed in the redistricting sector in the US during the 1990s took a new approach to how they had previously carried out their job. Recent gerrymanders have led to the establishment of "majority-minority districts", where minority groups may have a greater opportunity to have elected representation, but the ultimate aim is to increase the number of congressional representatives won by a particular party in a given state. This process of active cartography has led to the production of some unusually shaped congressional districts, such as the widely used example of North Carolina's 12th district, visible in Fig. 3 below showing changes between the 112nd and 113rd Congress. Boundaries were redrawn in order to group Democratic votes within safe blue districts, a process known as "packing", and move Republican voters to neighboring districts, in order to reach a majority. It is worth noting that many of the districts with large visible changes, such as the 8th, 11th, and 13th have shifted in terms of party support from "blue" to "red," while the most irregularly shaped districts, such as the 4th and 12th are used to group areas of strong Democratic support, demonstrating the electoral impact of the modern redistricting process.

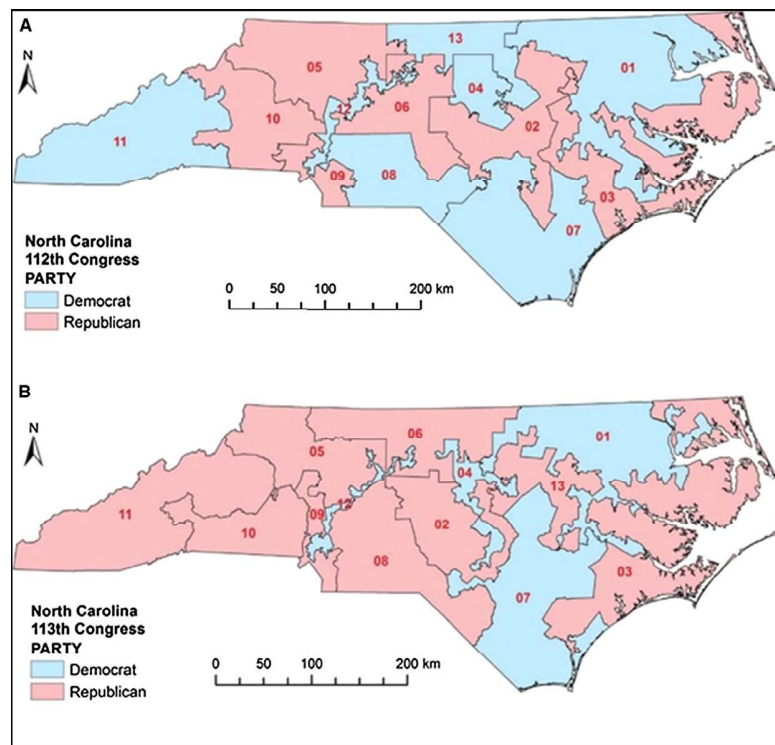


Figure 3 North Carolina Congressional districts in the 112nd and 113rd congress. Fan et al. (2015).

Recent research has focused on the redrawing of constituency boundaries and the electoral abuses of gerrymandering and malapportionment, while other research in this field has highlighted the impact of first past the postelectoral systems (and other electoral systems) in producing disproportional and biased electoral results. The availability of more detailed electoral data at the aggregate level has encouraged marked-register analyses-based studies of voter turnout levels (as in the Republic of Ireland). Research has also focused on the underrepresentation of “Other” groups. The process of electoral cartography has been viewed as a useful tool in identifying and addressing instances of political and electoral inequality. The cartographic process was utilized in the 2011 Northern Irish Assembly Election, the 2011 General Election in the Republic of Ireland, and the 2014 Local Election in the Republic of Ireland, to examine the impact of district magnitude on gender inequality, and proved a useful tool in realizing potential solutions.

Critiques of electoral geography claim that research tends to focus on isolated studies of specific elections within specific states or regions and, hence, fails to help create a coherent body of knowledge that would add to the overall study of political geography. Other commentators view it as overtly empirical in approaches and not underpinned by well-developed theoretical frameworks, making for an atheoretical stance that leaves it at odds with general trends within contemporary human geography. Furthermore, certain aspects of the electoral process, such as voting practices by gender, are often invisible to electoral analysis. Political scientists and electoral geographers have access to polling and survey data, but cartography is limited in this sense, especially as the actual practice of voting is secret and therefore difficult to map. Feminist scholars also view GIS mapping as a “masculine” field, which does not fully benefit the methodologies of feminist geographers. Prominent academics have portrayed GIS mapping as being inherently positivist and universalizing, noting the need to expand the process beyond the quantitative in order to have a meaningful role in feminist geographies.

There are a number of exciting innovations which afford opportunities to address some of these concerns. Open source GIS allows the political landscape to be aggregated into an “Open” patchwork of electoral analyses. Qualitative electoral cartography expands the field beyond its inherently quantitative roots. Open source GIS places a focus on open data, open software, open hardware, open standards, open research collaboration, open publication, open funding, and open education/learning. The “Open” nature of the technology allows for detailed temporal analysis of data at scales ranging from the global to the local, while also affording the opportunity for collaborations with associated disciplines, keeping electoral studies rooted in the larger frame of human geography, as well as the other social sciences. The application of open source GIS to the field of electoral cartography allows for global cooperation to enhance and deepen the understanding of the various social and political issues of our time, using both a social and a geographical lens. The “Open” nature of this application also allows for input from various third parties, while being simultaneously open to user review in order to improve methodology and analysis, thus retaining the benefits of peer review and replication of methods. The growing global digital network and range of devices which can support open source GIS software,

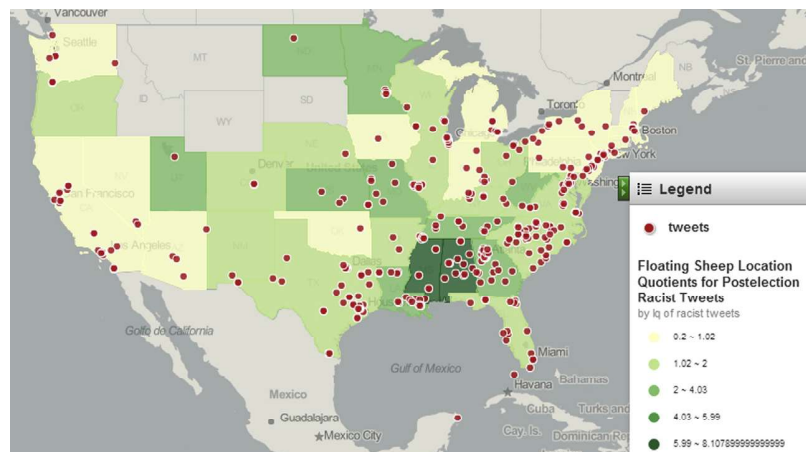


Figure 4 Map of the location quotients for post-election racist tweets. Floating Sheep (2012).

combined with the low cost for users, does not constrict the overall potential collaborator pool, thus leading to a database which is inherently accessible and open to all modes of input and review.

Given the wide range of issues that can impact on an individual's voting preference, the integration of qualitative GIS research methods has provided a new medium for electoral cartography to engage with the social and demographic causal factors, which serve to produce spatial variation. The application of qualitative mapping has been applied to examine themes such as the geolocation of tweets in the 2010 municipal elections in Ottawa, Ontario, Canada, and the mapping of racist tweets during the 2008 Obama election campaign in the US, as demonstrated in Fig. 4 below.

The practical framework for qualitative GIS research, utilizing open source software, allows for sources such as interviews, surveys, focus groups, document analysis, and media analysis to be drawn into electoral research design. Overall, the application of a qualitative open source GIS framework has the potential to add new layers of representation and analysis to electoral cartography, thus enriching it with a human perspective and securing it within the wider context of human geography.

Another critique leveled at electoral geography relates to the manner in which geography is an epiphenomenal, or residual, factor. Efforts to promote a stronger theoretical dimension have found strong resonances with realist philosophy and structuration theory. These focus around arguments for the need to better situate electoral research within frameworks that locate this within the larger perspective of global economic transition, while also placing greater stress on the impact of the local context. This places greater emphasis on the role of geographical scale in electoral research, while also highlighting the importance of place, or the local context, in terms of electoral decision-making processes. Researchers have advocated a world-systems approach to the study of electoral geography, which would also address the discipline's failure to study elections in the developing world. This approach would also argue for the need to understand how electoral behavior is shaped by structural constraints, thus analyzing how voters in specific places are responding to global processes. Creating electoral cartographies within such frameworks allows for place-specific electoral behavior to be studied with reference to the wider social, political, and economic contexts provided by changing global economic trends, as well as the localized institutions and cultural practices that mediate the political responses to these global processes at the local level.

Basing electoral cartography on an approach to electoral geography that marries a series of different but interrelated geographical scales refocuses electoral geography as a study of how historical-geographical context impacts on political behavior. In stressing the importance of geographic scale and basing researches on a place-centered approach, while linking these to new (and ongoing) developments in geographical statistics and computer-mapping work and a greater openness to the use of qualitative techniques, a blueprint can be set for electoral cartography to prosper. In doing so, a revitalized electoral geography and electoral cartography promises to offer fresh insight not just to the subdiscipline of political geography, but also to the larger study of human geography, as well as political science and the other social sciences.

See Also: Gerrymandering; Maps; Place; Political Geography; Political Representation.

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Relevant Websites

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- CNN's Election 2016 website: <http://www.edition.cnn.com/election/2016>.
- Dave Bradlee's Redistricting website: <http://gardow.com/davebradlee/redistricting/>.
- Dorling Cartogram Application: <https://www.arcgis.com/home/item.html?id=b686a7679cb747e9825d1d1bb6b26046>.
- ESRI Redistricting Application: <https://www.esri.com/en-us/arcgis/products/esri-redistricting/overview>.
- Floating Sheep geography blog: <http://www.floatingsheep.org>.
- The Guardian's elections website: <http://www.theguardian.com/politics/electionspast>.