

# Visual analysis of ICC themes and topics from 2009 to 2019

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**Abstract:**

The themes and topics of the conference reflect the hot issues of the conference. The change of conference theme reflects the development and change of the hot topics of discipline research from the side. This paper uses bibliometrics to quantitatively analyze the topics and topics of International Cartographic Conference (ICC) from 2009 to 2019, and presents them through visualization methods such as label clouds, charts and so on.

The research mainly includes three aspects: 1. Fixed topic analysis refers to the analysis of topics in past years, which can reflect the core content of ICC; 2. High-frequency topic analysis refers to the analysis of topics with high frequency, which can reflect hot topics of general concern; 3. Sudden topic analysis refers to the division of topics with sudden increase in short time. The analysis can reflect the research content with high heat in a short time. From the perspective of text analysis, this study analyzed the conference topics, which reflected the development and research changes of Cartography in the ten years, and provided some references for our experts in their research.



Figure 1. Word-Cloud for High Frequency Key Words in themes and topics.

2009	2011	2013	2015	2017	2019
Production systems Map production systems, economic, management and technological aspects.	acques Bertin cartographic work and influences	Art and Cartography	Art and Cartography	Visual analytics, geovisualization, and dynamic cartography.	Art and Cartography;
Basic Cartography Marine cartography and hydrographic charting, aeronautical cartography, military mapping.	Semiotics, map perception, cognition and knowledge	Atlases	Atlases	Spatial analysis, geocomputation, modelling, and data mining.	Atlases;
Infrastructure (NSDI) Spatial Data Infrastructures (NSDI, GSDI and SDD) at national, regional and world levels.	Colors, Signs and Typography on paper and digital maps	Cartography and Children	Cartographic Heritage into the Digital	Virtual reality, augmented reality, 3D mapping, and Geodesign.	Cartographic Heritage into the Digital;
Spatial data handling and the development and use of geospatial standards. Spatial databases, updating, versioning, and spatial querying.	GeoVisualisation, Visual Analytics, Augmented and Virtual Reality	Cartography in Early Warning and Crisis Management	Cartography and Children	Generalization, multi resolution data, and multi-scale representation.	Cartography and Children;
Hazards and disasters Cartography for early warning, crisis management, disaster relief and poverty eradication.	Maps and the Internet	Cognitive Visualization	Cartography in Early Warning and Crisis Management	Thematic cartography and multivariate data mapping.	Cartography in Early Warning and Crisis Management;
GIS Digital cartography and GIS for sustainable development of territories.	SDL Standards, Ontologies, Integration	Data Quality	Cognitive Issues in Geographic Information Visualization	Bertin's "Sémiologie Graphique" at 50 years; semiology.	Cognitive Issues in Geographic Information Visualization;
Satellite imagery Cartography and satellite imagery for the management of natural resources and the	Data quality	Digital Technologies in Cartographic Heritage	Education and Training	User studies; user experience and usability; user interface design.	Education and Training;
History The history of cartography and the cartography of history.	Location Based Services and Ubiquitous Cartography	Education and Training	Generalisation and Multiple Representation	Cognitive issues in map use and design.	Generalisation and Multiple Representation;
Physical knowledge Maps for the blind and visually impaired.	Volunteered geographic information, Crowdsourcing and Critical Cartography	Generalization and Multiple Representation	Geospatial Analysis and Modeling	Children and cartography.	Geospatial Analysis and Modeling;
Map Projections Cartographic Projections.	GeoInformation retrieval	Geoinformation Infrastructures and Standards	GI for Sustainability	Accessible cartography for people with disabilities.	GI for Sustainability;
Geospatial analysis Geospatial analysis, modelling and geoinformation science.	Generalisation and Multi-scale Representation	Geospatial Analysis and Modeling	the History of Cartography	Education and training in cartography and geospatial technologies.	History of Cartography;
Toponymy Toponymy and Geographic Names.	Spatio-Temporal modelling and issues (3D, simulation)	Geovisualization	Location Based Services	Outreach, geospatial MOOCs, and sharing mapping methods beyond cartography.	Location Based Services;
Internet Cartography and the Internet, mobile services, ubiquitous computers, and location	Use and User Issues	GI for Sustainability	Map Design	Design of maps.	Map Design;
Geospatial analysis Geospatial analysis, modelling and geoinformation science.	Mapping and Spatial awareness for disabled people	History of Cartography	Map Production and Geoinformation Management	Arts and culture; spatial digital humanities.	Map Production and Geoinformation Management;
	Geospatial analysis	Map Design	Map Projections	History of cartography and historical cartography.	Map Projections;
	Maps, GIS & Sustainable development	Map Production and Geo-Business	Maps and Graphics for the Blind and Partially Sighted People	Digital issues in cartographic heritage; map and geoinformation curatorship.	Maps and Graphics for Blind and Partially Sighted People;

Figure 2. List of themes and topics for 2009-2019 in ICC. (part)