Marc (Mustafa) Mokrech

Environmental Institute of Houston & Department of Environmental Science
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Summary

Specialised in Geospatial Sciences with teaching experience at the undergraduate and graduate levels. Extensive interdisciplinary research in geospatial modeling for understanding implications associated with future environmental and socio-economic conditions. Experience of applied spatial modeling in various fields including coastal management and adaptation to future changes, impact assessment of future climate on urban and natural environments, hydrological and watershed analysis, terrain analysis, and uncertainty management in GIS-based soil erosion models. Current research interests are in applied research that includes the use of small Unmanned Aircraft Systems (sUAS) in ecological applications, the use of sUAS in 2D/3D mapping, and the use of data from small satellites for analyzing human-environment interactions.

Education

2001 Ph.D., Geospatial Sciences, Department of Geography, King's College, University of London, London, UK.

Dissertation: Error propagation and uncertainty management of a GIS-based soil erosion model.

1995 M.SC. in Engineering, Faculty of Engineering, Cairo University, Cairo, Egypt.

Research project: Geodetic database and geographic information systems

!986 B.Sc., Civil Engineering, Faculty of Civil Engineering, Aleppo University, Aleppo, Syria.

Professional Experience

2010 – Present Senior Research Scientist.

Environmental Institute of Houston, Houston, Texas, USA.

2010 – Present Lecturer of Geospatial Sciences

College of Science and Engineering, University of Houston Clear Lake, Houston, Texas, USA.

2004 – 2010 Senior Research Scientist

Engineering and Environment and the Tyndall Centre for Climate Change Research, University of Southampton, Southampton, United Kingdom.

2004 – 2010 Lecturer of Geospatial Sciences

Engineering and Environment, University of Southampton, Southampton, United Kingdom.

2002 – 2004	Assistant Professor of Geospatial Sciences
	Department of Geography, United Arab Emirates University, Al Ain, UAE,
1999 – 2002	Research Fellow
	Department of Geography, King's College, University of London, London, UK
1988 – 1992	Teaching assistant of Terrestrial Survey
	Department of Topography, Faculty of Civil Engineering, Aleppo University, Aleppo, Syria

Teaching Experience

Undergraduate Level	Graduate Level
Geographic Information Sciences (GIS)	Advanced GIS
Applied GIS	GIS for Environmental Applications
Geospatial Technologies	GIS for Coastal Engineers
Principles of remote sensing	
Digital image processing	
Photogeology	
Principles of Cartography	

Current Research Interests

Impact assessment of future climate and socio-economic changes

Coastal management and climate adaptation.

Integrated flood simulations.

Ecological applications of small Unmanned Aircraft Systems.

2D/3D mapping using small Unmanned Aircraft Systems.

Recent Awards

2017 UHCL Outstanding Lecturer Award

2012 Lloyds Science of Risk Prize Award

Skills

PROGRAMMING: C , VB.Net and Python

GIS AND REMOTE SENSING: ARCGIS, ERDAS, IDRISI, and Pix4D

Research Projects

2023 Upscaling mangrove restoration for coastal hazard reduction in a deltaic environment: Prioritizing restoration efforts for nature-based solutions in the Volta Delta.

2023 Microplastic distribution and impacts to a wetland dwelling sentinel species with emphasis on public education and future effects of sea-level rise to shoreline habitats.

2020 Baseline study of alligator snapping turtle population viability in Texas.

2020 Distribution and habitat associations of the western chicken turtle in Texas.

2019 Characterization of the Influence of Freshwater Inflow on Trinity River Delta Indicators.

2017 Assessment of Shorebird Populations in Galveston Bay Using Conventional and UAV Techniques.

2016 Trinity River Delta and Surrounding Waters Atlantic Rangia Population Assessment.

2016 Mapping shallow reefs using low-cost side scanning sonar and drone photography systems.

2014 Impacts and Risks from High-End Scenarios: Strategies for Innovative Solutions (IMPRESSIONS).

2013 Distribution of Piping Plover on the Upper Texas Coast.

2013 Armand Bayou Water Quality Improvement Partnership.

2012 Harris County Texas Comprehensive Turbidity Study.

2011 Texas Nutrient Criteria Development Support Project.

2011 Time of Travel Study at the Mason Park.

2010 Climate Change Integrated Assessment Methodology for Cross-sectoral Adaptation and Vulnerability in Europe (CLIMSAVE).

2010 Phase 2 of the Coast Program at the Tyndall Centre for Climate Change Research.

2008 Regional Assessment of Coastal Flood Risk: a tiered framework for coastal flood risk assessment.

2008 BRANCH: modeling habitat loss and developing a GIS-based Archive.

2008 Analyzing future implications of climate change and sea-level rise in Mombasa, Kenya.

2007 Regis2: Regional climate change impact and response studies.

2006 Influence of Climate Change on the Erosion of Beaches and Cliffs.

Selected Publications and Reports

Vallery, A., **Mokrech, M.**, Guillen, G. (In Progress) Methodology for Utilizing UAV Technology for Surveying Waterbirds in Coastal Environments. Waterbirds.

Mokrech, M., Nicholls, R., Kebede, A., and Brown, S. (In Progress) Coastal flood impacts and adaptation in Europe Under high-end scenarios : application of DIVA and CLIMSAVE models. Climatic Change.

Metz, T.L., Gordon, M., **Mokrech, M.**, and Guillen, G. (2020) Movements of Juvenile Green Turtles (Chelonia mydas) in the Nearshore Waters of the Northwestern Gulf of Mexico. Front. Mar. Sci. 7:647.

Fronzek, S., **Mokrech, M**., and 19 other co-authors (2019) Sensitivity to climate and socio-economic change across sectors and European regions using the impact response surface approach. *Reg Environ Change* **19**, 679–693

Lobanova, A., Flörke, M., Wimmer, F., **Mokrech, M**., Smith, A. (2018) IMPRESSIONS policy brief: Water supply and flood risk - Integrated solutions to address high levels of climate change. Available at: https://drive.google.com/drive/folders/1C8_IFjWEbm_WteklQ_8zJbBEB2yXKIy5

Sánchez-Arcilla, A., Brown, S., Haasnoot, M., Hinkel, J., Islam, S., **Mokrech, M**., Nicholls, R.J., and Vousdoukas, M. (2017). Coastal protection. In a policy booklet: High-end climate change in Europe: Impacts, Vulnerability and Adaptation. Editors: Pam Berry, Richard Betts, Paula Harrison and Agustín Sanchez-Arcilla.

Mokrech, M., Kebede, A.S., Nicholls, R.J. (2017) Assessing flood impacts, wetland change and adaptation in Europe: the CLIMSAVE approach. Environmental modeling with stakeholders: Theory, Methods and Applications. Editors: Gray, S.A., Paolisso, M.J., Gray, S.R.J. and R.C. Jordan.

Mokrech, M., Gardiner, S., Nicholls, R.J., Watkinson, A.R. and Sutherland, W.J. (2015). Coastal wetland habitats: future challenges and potential solutions. In Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer.

Mokrech, M., Nicholls, R.J., Day, S., Dawson, R.J., Jude, S. and Koukoulas, S. (2015). GIS platforms for managing, accessing and integrating model results: The Tyndall Coastal Simulator experience. In Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer.

Fontaine, C.M., **Mokrech, M**., and Rounsevell, M.D.A. (2015). Land use dynamics & coastal management. In Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer.

Jude, S., **Mokrech, M**., Walkden, M., Thomas, J. and Koukoulas, S. (2015). Visualising potential coastal change: communicating results using visualisation techniques. In Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer.

Mokrech, M., Kebede, A.S., Nicholls, R.J. and Wimmer, F. (2015). An integrated approach for assessing flood impacts due to future climate and socio-economic conditions and the scope of adaptation in Europe, Climatic Change, Vol 128, 3, 245-260

Kebede, A.S., Dunford, R., **Mokrech, M**., Audsley, E., Harrison, P.A., Holman, I.P., Nicholls, R.J., Rounsevell, M.D.A., Sallaba, F., Sanchez, A., and Wimmer, F. (2015). The sensitivity of cross-sectoral impacts of climate and socio-economic drivers on key European sectors, Climatic Change, Vol 128, 3, 261-277.

Mokrech, M., Nicholls, R.J., and Dawson, R. J. (2012) Scenarios of future built environment for impact assessment of climate change using a multi-criteria approach in GIS. Environment & Planning B: Planning & Design. Vol. 30, 120-136.

Kebede, A.S., Nicholls, R.J., Hanson, S., and **Mokrech, M**. (2012). Impacts of Climate Change and Sea-Level Rise: A Preliminary Case Study of Mombasa, Kenya. Journal of Coastal Research. Vol. 28, 1A, 8-19.

Mokrech, M., Hanson, S., Nicholls, R. J., Wolf, J., Walkden, M.J.A., Fontaine, C., Nicholson-Cole, S., Jude S.R., Leake, J., Stansb,y, P. K., Watkinson, A. R., Rounsevell, M.D.A., Lowe, J. A., Hall, J.W. (2011) "The Tyndall coastal simulator." Journal of Coastal Conservation. 15:325-335

Mokrech, M., Nicholls, R.J., Gardiner, S., Jude S. and Berry, P. (accepted) Integrating Geomorphic, Habitat and Species Change Simulations into Geographic Information Systems: the BRANCH Coastal Archive, Journal of Coastal Research.

Dawson, R. J., Dickson, M. E., Nicholls, R. J., Hall, J. W., Walkden, M. J. A., Stansby, P., **Mokrech, M**., Richards, J., Zhou, J., Milligan, J., Jordan, A., Pearson, S., Rees, J., Bates, P., Koukoulas, S., Watkinson, A. (2009) Integrated analysis of risks of coastal flooding and cliff erosion under scenarios of long term change, Climatic Change, 95, 249-288

Mokrech, M., Nicholls, R.J., Richards, J., Henriques, C., Holman, I.P. and Shackley, S. (2008) Regional impact assessment of flooding under future climate and socio-economic scenarios in East Anglia and North West, England, UK, Climatic Change, Volume 90, 31 - 55

Richards, J.A., **Mokrech, M**., Berry, P.M. and Nicholls, R.J. (2008) Climate change and floodplain ecosystems: regional assessment and adaptation potential, Climatic Change, Volume 90, 141 - 167

Holman, I.P., Rounsevell, M.D.A., Cojacaru, G., Shackley, S., McLachlan, C., Audsley, E., Berry, P.M., Fontaine, C., Harrison, P.A., Henriques, C., **Mokrech, M**., Nicholls, R.J., Pearn, K.R. and Richards, J.A. (2008) The concepts and development of a participatory regional integrated assessment tool. Climatic Change, Volume 90, 5 – 30

Mokrech, M., Nicholls, R.J., Richards, J., Watkinson, A., J., Jude, S., Milligan, J., Hall, J., Walkden, M., Stansby, P., Wright, J., Rounsevell, M., Fontaine, C., Acosta-Michlik', L., Lowe, J., and Wolf, J. (2007) The Development of an Integrated Coastal Simulator for Supporting Long Term Coastal Management. Int. Conf. on Coastal Management, Cardiff, pp. 203-217.

Nicholls, R.J., Hanson, S., **Mokrech, M**., Stansby, P., Chini, N., Walkden, M., Dawson, R., Roche, N., Hall, J., Nicholson-Cole, S., Watkinson, A., Jude, S., Lowe, J., Wolf, J., Leake, J., Rounsevell, M., Fontaine, C. and Acosta-Michlik, L.(2009) The Tyndall coastal simulator and interface. In, McKee Smith, Jane (ed.) Coastal Engineering: Proceedings of the 31st International Conference. Coastal Engineering 2008: 31st International Conference on Coastal Engineering London, UK, World Scientific, 4341-4353. (doi:10.1142/9789814277426_0360).

Guillen, G., **Mokrech, M**, Oakley, J., Shepard, M., Vale, K., (2012). Time of travel study at the Mason Park. Final report prepared in cooperation with the Harris County Flood Control District. Project ID: Z100-00-00-Y053. Report # 12-002.

Guillen, G., **Mokrech, M**, Oakley, J., Shepard, M., Vale, K., Moss, A., (2012). Harris County Texas Comprehensive Turbidity Study Results Report. Final report prepared in cooperation with the Harris County Flood Control District Project ID: Z100-00-00-Y053

Leake, J., Wolf, J., Lowe, J., Stansby, P., Jacoub, G., Nicholls, R., **Mokrech, M**., Nicholson-Cole, S., Walkden, M., Watkinson, A. and Hanson, S. (2007) Integrated Modeling for Coastal Impacts. Proceedings 10th International Conference on Estuarine and Coastal Modelling, November 2007, Newport, Rhode Island. ASCE. New York.

Leake, J., Wolf, J., Lowe, J., Stansby, P., Jacoub, G., Nicholls, R., **Mokrech, M**., Nicholson-Cole, S., Walkden, M., Watkinson, A., and Hanson, S. (2007) Predicted Wave Climate for the UK: Towards an Integrated Model of Coastal Impacts of Climate Change. Estuarine and Coastal Modeling (2007): pp. 393-406. DOI: 10.1061/40990(324)24

Mokrech, M., Nicholls, R.J., Richards, J., Watkinson, A., J., Jude, S., Milligan, J., Hall, J., Walkden, M., Stansby, P., Wright, J., Rounsevell, M., Fontaine, C., Acosta-Michlik', L., Lowe, J., and Wolf, J., (2007). A Coastal Simulator for Supporting Long Term Coastal Management, Coast GIS 2007, Santander, Spain.

Holman, I.P., Berry, P.M., **Mokrech, M.**, Richards, J.A., Audsley, E., Harrison, P.A., Rounsevell, M.D.A., Nicholls, R.J., Shackley, S., Henriques, C. (2007). Simulating the effects of future climate and socio-economic change in East Anglia and North West England: the RegIS2 project. Summary Report. UKCIP, Oxford 2007. ISBN: 978-1-906360-00-9

Mokrech, M., Nicholls, R.J., Richards, J., Henriques, C., Holman, I.P. and Shackley, S., (2005). Regional Impact Assessment of Flooding under Future Climate Change and Socio-economic Scenarios in East Anglia and North West, England, UK. In Holman I.P. and de Vries T.T. (eds.) Development of a metamodel tool for regional integrated climate change management (RegIS2), Final Report of Defra project No. CC0362. Pp 36-56.

Koukoulas, S., Nicholls, R.J., Dickson, M.E, Walkden, M., Hall, J.W, Pearson, S.G, **Mokrech, M**. and Richard, J., (2005). A GIS tool for analysis and interpretation of coastal erosion model outputs (SCAPEGIS). In, Coastal Dynamics 2005. 5th International Conference on Coastal Dynamics Virginia, USA, American Society of Civil Engineers.

Richards, J.A., **Mokrech, M**. and Nicholls, R.J., (2005). Regional Scale Assessments of the Impacts of Climate Change on Coastal and Fluvial Ecosystems and the Scope for Adaptation. In Holman I.P. and de Vries T.T. (eds.) Development of a metamodel tool for regional integrated climate change management (RegIS2), Final Report of Defra project No. CC0362. pp. 128-152.

Holman, I.P., Berry, P.M., **Mokrech, M**., Richards, J. A., Audsley, E., Harrison, P.A., Rounsevell, M.D.A., Nicholls, R. J., Shackley, S., Henriques, C., (2007). "Simulating the effects of future climate and socio-economic change in east Anglia and North West England: the RegIS2 project. Summary Report." UKCIP, Oxford 2007

Pearson, S., Rees, J., Poulton, C., Dickson, M., Walkden, M., Hall, J., Nicholls, R., **Mokrech, M**., Koukoulas, S., and Spencer, T., (2005). Towards an integrated coastal sediment dynamics and shoreline response simulator: Tyndall Centre Technical Report No. [38].

Nicholls, R.J., **Mokrech, M**., Richards, J., Bates, P., Dawson, R., Hall, J., Walkden, M., Dickson, M., Jordan, A. and Milligan, J., (2005). Assessing coastal flood risk at specific sites and regional scales: Regional assessment of coastal flood risk: Tyndall Centre Technical Report No. [45].

Mokrech, M., Drake, N and Wainwright, J (2003) Uncertainty modelling and error propagation in GIS based soil erosion model. In, GISRUK '03, London, GB.