# Hidrodinámica de ríos

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# Exploración de datos

# Exploración de datos I

De acuerdo a Deaton[1] la disponibilidad de los siguientes datos es crucial:

- Características topográficas del canal:
  - Longitud.
  - Elevación.
  - Pendientes,
- Características de transporte del canal:
  - Elevación de la superficie del agua.
  - Ancho.
  - Coeficientes de rugosidad.
- Datos de la condición final de frontera.
- Condición inicial.

# Inspiración y motivación

# Inspiración y motivación

- Sistemas 1D y 2D.
- Fomentar interdisciplinariedad en el proyecto.
- Manejo de datos geoespaciales.
- Mi novia.

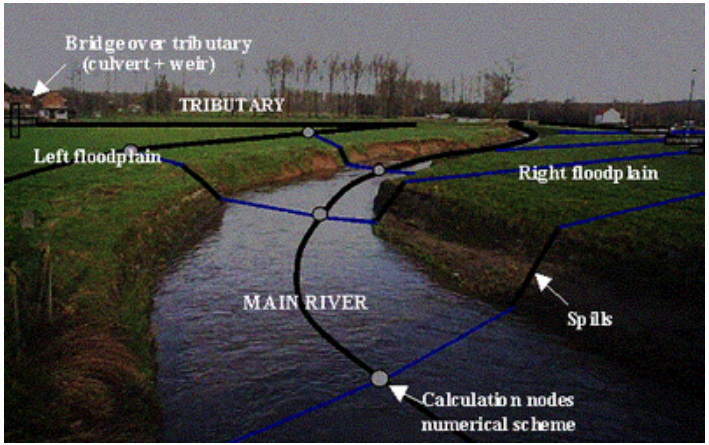


Figura: Ejemplo de modelamiento [3].

# Objetivos

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- Apicar los conceptos de la clase de Sistemas Dinámicos en un proyecto con enfoque en datos geoespaciales.
- Un aplicativo interactivo que permita realizar simulaciones sobre la dinámica de un río específico.
- Expandir el conocimiento de problemáticas y situaciones medioambientales del autor.

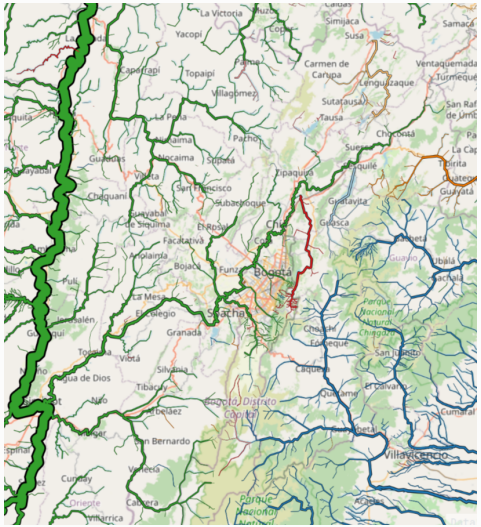


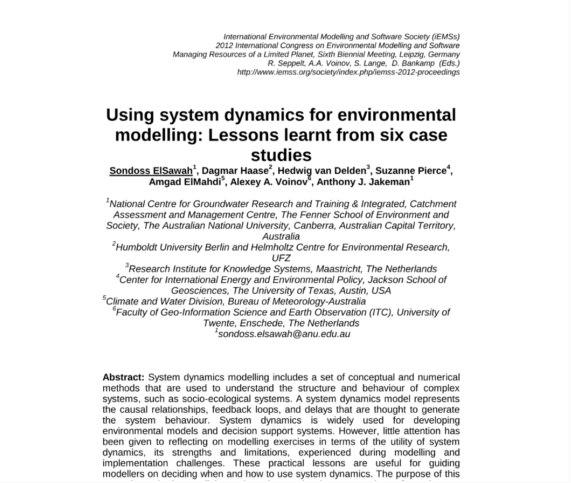

Figura: Algunas Rutas hídricas de Colombia. Datos de OpenStreetMap[7].

# Revisión bibliográfica

# Revisión bibliográfica

## *Using dynamics for environmental modelling: Lessons learnt from six case studies*[5]

- Revisión de algunos casos de aplicación de sistemas dinámicos en problemáticas ambientales.
- Aplicación de un juego interactivo.



International Environmental Modelling and Software Society (iEMSs)
2012 International Congress on Environmental Modelling and Software
Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany
R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.)
http://www.iemss.org/society/index.php/iemss-2012-proceedings

**Using system dynamics for environmental modelling: Lessons learnt from six case studies**

Sondoss ElSawah[1], Dagmar Haase[2], Hedwig van Delden[3], Suzanne Pierce[4], Amgad ElMahdi[5], Alexey A. Voinov[6], Anthony J. Jakeman[1]

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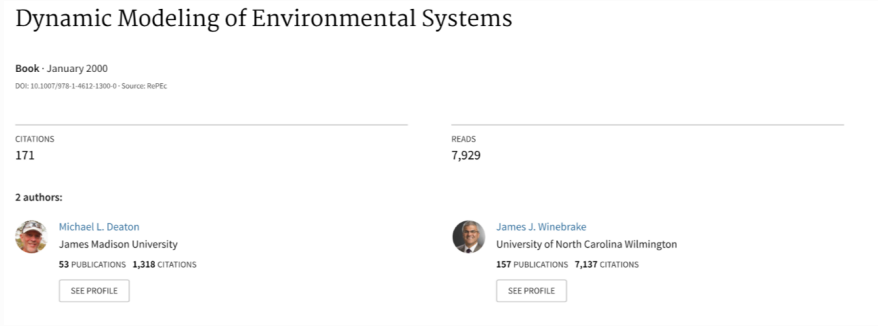
**Abstract:** System dynamics modelling includes a set of conceptual and numerical methods that are used to understand the structure and behaviour of complex systems, such as socio-ecological systems. A system dynamics model represents the causal relationships, feedback loops, and delays that are thought to generate the system behaviour. System dynamics is widely used for developing environmental models and decision support systems. However, little attention has been given to reflecting on modelling exercises in terms of the utility of system dynamics, its strengths and limitations, experienced during modelling and implementation challenges. These practical lessons are useful for guiding modellers on deciding when and how to use system dynamics. The purpose of this

# Revisión bibliográfica

## *Dynamic modeling of environmental systems*[1]

- Modelado mediante Sistemas Dinámicos con diferentes aplicaciones ambientales.
- Capítulo dedicado a hidrodinámica de ríos.
- Ejemplo de aplicación para el río Altamaha.



Dynamic Modeling of Environmental Systems

**Book** · January 2000

DOI: 10.1007/978-1-4612-1300-0 · Source: RePEc

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**2 authors:**

Michael L. Deaton
James Madison University
**53** PUBLICATIONS **1,318** CITATIONS
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James J. Winebrake
University of North Carolina Wilmington
**157** PUBLICATIONS **7,137** CITATIONS
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# Otros recursos encontrados

- *Introduction to depth averaged modeling and user's manual*[6].
- *An Introduction to Hydrodynamics and Water Waves*[4].
- *Theory and Practice of Hydrodynamic Reconstruction in Plain River Networks*
- *Computational river dynamics*[8].
- *River mechanics*[2].

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# *Datasets*

# Datasets I

- Modelo Digital de Elevación. Colombia http://www.colombiaenmapas.gov.co/?e=-75.21433704101813,4.250807726576179,-65.21677844727078,10.458355638020791,4686&b=igac&l=159&u=0&t=23&servicio=159
- Datos de ríos en Colombia htts://www.openstreetmap.org
- Obtener coeficientes de rugosidad de Mannings a través de publicaciones científicas.

# Referencias

# Referencias I


[1] Michael Deaton y James J Winebrake. *Dynamic modeling of environmental systems*. Springer Science & Business Media, 1999.

[2] Pierre Y Julien. *River mechanics*. Cambridge University Press, 2018.

[3] KU Leuven Hydraulics Research. *Urban River Research*. n.d. URL: https://bwk.kuleuven.be/hydr/Research/urban-river/River.

[4] Bernard Le Méhauté. *An introduction to hydrodynamics and water waves*. Springer Science & Business Media, 2013.

# Referencias II

[5] Sondoss El-Sawah et al. “Using system dynamics for environmental modelling: Lessons learnt from six case studies”. En: *6th International Congress on Environmental Modelling and Software 2012: Managing Resources of a Limited Planet: Pathways and Visions under Uncertainty*. International Environmental Modelling y Software Society (iEMSs). 2012, págs. 1367-1374.

[6] Peter Steffler y Julia Blackburn. “Introduction to depth averaged modeling and user’s manual”. En: *University of Alberta, Edmonton, Alta* (2002).

[7] Waterway Map Project. *Waterway Map*. n.d. URL: https://waterwaymap.org/#map=8/4.876/-73.791.

[8] Weiming Wu. *Computational river dynamics*. Crc Press, 2007.


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