



**Jordi Batlle-Aguilar** B.Sc. M.Sc. PhD.

Senior Hydrogeologist

## Overview

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Jordi has more than 10 years' experience in hydrogeology in the application of innovative hydrogeological techniques to support water resources assessment, as well as human health and ecological risk. Jordi has expertise in surface water–groundwater interaction, site investigation, use of environmental tracers and hydrogeochemistry to determine recharge rates, sources and cross-contamination between aquifers, estimating fluid flow and solute transport in aquifers and aquitards, design and implementation of groundwater monitoring networks, and groundwater modelling. Jordi has gained an important breadth of knowledge and skills thanks to having worked in a rich variety of projects, environments and climatic settings, from urban Europe (Spain, France, Belgium, Switzerland and Romania), to remote areas of Africa (Burkina Faso), Australia and the central plains of the United States of America.

Since the end of his Ph.D. Jordi worked in several universities in Europe and Australia. Between 2014 and 2017 Jordi worked in Kansas (USA) where he coordinated fundamental and applied research projects on groundwater quality and hydrogeology, of both national and local significance. During that time Jordi also supported the Kansas Geological Survey's efforts in the areas of technical service and communication, education and public information, routinely collaborating with local stakeholders, water districts and state water agencies. Jordi has comprehensively published in international peer-reviewed journals, authored several project reports and presented at numerous international conferences.

## Qualifications

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| 2008 | PhD.  | University of Liège (BELGIUM)  |
|      |       | Thesis: <i>Groundwater flow and contaminant transport in an alluvial aquifer: in-situ investigation and modelling of a brownfield with strong groundwater – surface water interactions</i> |
| 2003 | M.Sc. | University of Paris XI (FRANCE)  |
|      |       | Thesis: <i>Axisymmetrical infiltration in soil imaged by non-invasive electrical resistivity</i>   |
| 2000 | B.Sc. | University of Barcelona (SPAIN)  |

## Employment History

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### **October 2017 – present**

Senior Hydrogeologist: Innovative Groundwater Solutions Pty Ltd. (AUSTRALIA)

### **September 2017 – October 2017**

Noble Gas Laboratory Technician: CSIRO (AUSTRALIA)

### **December 2014 – July 2017**

Assistant Scientist: Kansas Geological Survey (USA)

### **July 2010 – November 2014**

Research Fellow: National Centre for Groundwater Research and Training (NCGRT), Flinders University (AUSTRALIA)

### **October 2008 – June 2010**

Postdoctoral Fellow: Ecological Engineering Laboratory, École Polytechnique Fédérale de Lausanne (SWITZERLAND)

## Recent Major Projects

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### **Tanami Gas Pipeline Hydrogeological Assessment & Water Supply Strategy**

Oct. 2017 – present, Australian Gas Infrastructure Tanami Pty Ltd.

### **Northern Australia Water Resource Assessment**

Feb. 2016 – present, CSIRO-NAWRA

## Publications

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### International Peer-Reviewed Journals

1. Xie, Y. and **Battle-Aguilar, J.** (2017). Limits of heat as a tracer to quantify transient lateral river-aquifer exchanges. *Water Resources Research*, 53(9): 7740 – 7755. <http://dx.doi.org/10.1002/2017WR021120>
2. Bresciani, O., Crasnowick, R.H., Banks, E.W., **Battle-Aguilar, J.**, Cook, P.G., Batelaan, O. (2017). Using hydraulic head, chloride and electrical conductivity data to distinguish between mountain-front and mountain-block recharge to basin aquifers. *Hydrology and Earth System Sciences Discussions*, 1-33. <http://dx.doi.org/10.5194/hess-2017-328>
3. **Battle-Aguilar, J.**, Banks, E.W., Batelaan, O., Kipfer, R., Brennwald, M.S., Cook, P.G. (2017). Groundwater residence time and aquifer recharge in multilayered, semi-confined and faulted aquifer systems using environmental tracers. *Journal of Hydrology*, 546: 150-165. <http://dx.doi.org/10.1016/j.jhydrol.2016.12.036>.
4. **Battle-Aguilar, J.**, Cook, P.G., Harrington, G.A. (2016). Comparison of hydraulic and chemical methods for determining hydraulic conductivity and leakage rates in argillaceous aquitard. *Journal of Hydrology*, 532: 102 – 121. <http://dx.doi.org/10.1016/j.jhydrol.2015.11.035>.
5. **Battle-Aguilar, J.**, Xie, Y., Cook, P.G. (2015). Importance of stream infiltration data for modelling surface water – groundwater interactions. *Journal of Hydrology*, 528: 683-693. <http://dx.doi.org/10.1016/j.jhydrol.2015.07.012>.
6. Lamontagne, S., Taylor, A.R., **Battle-Aguilar, J.**, Suckow, A., Cook, P.G., Morgenstern, U., Stewart, M. (2015). River infiltration to a subtropical alluvial aquifer inferred using multiple environmental tracers. *Water Resources Research*. 51(6): 4532-4549. <http://dx.doi.org/10.1002/2014WR015663>.
7. Welch, C., Harrington, G.A., Leblanc, M., **Battle-Aguilar, J.**, Cook, P.G. (2014). Relative rates of solute and pressure propagation into heterogeneous alluvial aquifers following river flow events. *Journal of Hydrology*, 511: 891-903. <http://dx.doi.org/10.1016/j.jhydrol.2014.02.032>.
8. **Battle-Aguilar, J.**, Harrington, G.A., Leblanc, M., Welch, C., Cook, P.G. (2014). Chemistry of groundwater discharge inferred from longitudinal river sampling. *Water Resources Research*, 50(2): 1550-1568. <http://dx.doi.org/10.1002/2013wr013591>.
9. **Battle-Aguilar, J.**, Morasch, B., Hunkeler, D., Brouyère, S. (2014). Benzene dynamics and biodegradation in alluvial aquifers affected by river fluctuations. *Groundwater*, 52(3): 388-398. <http://dx.doi.org/10.1111/gwat.12070>.
10. **Battle-Aguilar, J.**, Cook, P.G. (2012). Transient infiltration from ephemeral streams: A field experiment at the reach scale. *Water Resources Research*, 48(11), W11518. <http://dx.doi.org/10.1029/2012WR012009>.
11. **Battle-Aguilar, J.**, Brovelli, A., Luster, J., Shrestha, J., Niklaus, P.A., Barry, D.A. (2012). Analysis of carbon and nitrogen dynamics in riparian soils: Model validation and sensitivity to environmental controls. *Science of the Total Environment*, 429: 246-256. <http://dx.doi.org/10.1016/j.scitotenv.2012.04.026>.

12. Brovelli, A., **Battle-Aguilar, J.**, Barry, D.A. (2012). Analysis of carbon and nitrogen dynamics in riparian soils: Model development. *Science of the Total Environment*, 429: 231-245. <http://dx.doi.org/10.1016/j.scitotenv.2012.04.027>.
13. **Battle-Aguilar, J.**, Brovelli, A., Porporato, A., Barry, D.A. (2011). Modelling soil C and N cycles during land use change: Review and model application. *Agronomy for Sustainable Development*, 31(2): 251-274. <http://dx.doi.org/10.1051/agro/2010007>.
14. Orban, Ph., Brouyère, S., **Battle-Aguilar, J.**, Couturier, J., Goderniaux, P., Leroy, M., Maloszewski, P., Dassargues, A. (2010). Regional transport modelling for nitrate trend assessment and forecasting in a chalk aquifer. *Journal of Contaminant Hydrology*, 118: 79-93. <http://dx.doi.org/10.1016/j.jconhyd.2010.08.008>.
15. Visser, A., Dubus, I., Broers, H.-P., Brouyère, S., Korcz, M., Orban, P., Goderniaux, P., **Battle-Aguilar, J.**, Surdyk, N., Amaraoui, N., Job, H., Pinault, J.-L., Bierkens, M. (2009). Comparison of methods for the detection and extrapolation of trends in groundwater quality. *Journal of Environmental Monitoring*, 11(11): 2030-2043. <http://dx.doi.org/10.1039/b905926a>.
16. **Battle-Aguilar, J.**, Brouyère, S., Dassargues, A., Morasch, B., Hunkeler, D., Höhener, P., Diels, L., Vanbroekhoven, K., Seuntjens, P., Halen, H. (2009). Benzene dispersion and natural attenuation in an alluvial aquifer with strong interactions with surface water. *Journal of Hydrology*, 369: 305-317. <http://dx.doi.org/10.1016/j.jhydrol.2009-02.014>.
17. **Battle-Aguilar, J.**, Schneider, S., Pessel, M., Tucholka, P., Coquet, Y., Vachier, P. (2009). Axisymmetrical infiltration in soil imaged by non-invasive electrical resistivity. *Soil Science Society of the America Journal*, 73(2): 510-520. <http://dx.doi.org/10.2136/sssaj2007.0278>.
18. Barth, J.A.C. *et al.*, (2009). Mobility, turnover and storage of pollutants in soils, sediments and waters: achievements and results by the EU project AquaTerra. A review. *Agronomy for Sustainable Development*, 29(1): 161 - 173. <http://dx.doi.org/10.1051/agro:2007060>.
19. Brouyère, S., **Battle-Aguilar, J.**, Goderniaux, P., Dassargues, A. (2008). A new tracer technique for monitoring groundwater fluxes: The Finite Volume Point Dilution Method (FVPDM). *Journal of Contaminant Hydrology*, 95: 121-140. <http://dx.doi.org/10.1016/j.jconhyd.2007.09.001>.
20. Barth, J.A.C. *et al.*, (2007). Selected groundwater studies of EU project AquaTerra leading to large-scale basin considerations. *Water Practice & Technology*, 2(3). <http://dx.doi.org/10.2166/wpt.2007.062>.
21. **Battle-Aguilar, J.**, Orban, Ph., Dassargues, A., Brouyère, S. (2007). Identification of groundwater quality trends in a chalk aquifer threatened by intensive agriculture in Belgium. *Hydrogeology Journal*, 15(8): 1615-1627. <http://dx.doi.org/10.1007/s10040-007-0204-y>.

## Book Chapters

22. **Battle-Aguilar, J.**, Brovelli, A., Porporato, A., Barry, D.A. (2010). Modelling soil carbon and nitrogen cycles during land use change. *In* Lichtfouse, E. *et al.* (eds). *Sustainable Agriculture*, Vol. 2. Springer, Netherlands. 499 – 527 pp.
23. Joziassse, J. *et al.*, (2010). BASIN – Integration of Research in AquaTerra River Basins. *In* Finkel *et al.* (eds.). *Advanced Tools and Models to Improve River Basin Management in Europe in the Context of Global Change*. Chapter 7. 51-61 pp.

24. Barth, J.A.C. *et al.*, (2009). Mobility, turnover and storage of pollutants in soils, sediments and waters: achievements and results by the EU project AquaTerra. A review. *In* Lichtfouse *et al.* (eds). Sustainable Agriculture, Vol. 1, Section 7 (Pollutants in agrosystems), Chapter 52.

## Refereed Conference Papers

25. **Batlle-Aguilar, J.**, Brouyère, S., Dassargues, A., Morasch, B., Hunkeler, D. (2011). Influence of natural attenuation and river fluctuations on benzene dispersion in an alluvial aquifer subject to strong interactions with surface water. *In* Proc. 7<sup>th</sup> International Groundwater Quality Conference, Zürich (SWITZERLAND). IAHS Publ 342. 243 – 246 pp.
26. **Batlle-Aguilar, J.**, Brouyère, S., Dassargues, A., Diels, L., Vanbroekhoven, K., Hunkeler, D., Morasch, B., Halen, H. (2008). Hydrodynamic characterisation of a groundwater – surface water system and evaluation of BTEX, PAHs decay and heavy metals fate. *In* Proc. of the 10<sup>th</sup> International conference on Soil-Water systems CONSOIL. Milan (ITALY).
27. **Batlle-Aguilar, J.**, Orban, Ph., Dassargues A., Brouyère, S. (2006). Identification of groundwater quality trends in a chalky aquifer threatened by intensive agriculture. *In* Proc. of the IAMG annual conference on Quantitative Geology from multiple Sources. Sart Tilman (BELGIUM).
28. Broers, H.P., Dubus, I.G., Bierkens, M., Visser, A., Brouyère, S., **Batlle-Aguilar, J.**, Korcz, M. (2005). Analysis of trends in groundwater pollutants: perspectives and challenges. *In* Proc. of the 9<sup>th</sup> International conference on Soil-Water systems CONSOIL. Bordeaux (FRANCE).

## Technical Reports

29. **Batlle-Aguilar, J.**, Butler, J. and Whittemore, D. (2017). Addressing groundwater goals of the Missouri Regional Planning Area. Final report. Kansas Geological Survey and Kansas Water Office. 44 pp.
30. **Batlle-Aguilar, J.** and Butler, J. (2017). Contaminant barriers or pathways? Hydraulic and chemical methods to improve characterization of shallow aquitards. Progress report year 1. Kansas Geological Survey, Lawrence, Kansas, USA. 15 pp.
31. Bresciani E., Batelaan O., Banks E.W., Barnett S.R., **Batlle-Aguilar J.**, Cook P.G., Costar A., Cranswick R.H., Doherty J., Green G., Kozuskanich J., Partington D., Pool M., Post V.E.A., Simmons C.T., Smerdon B.D., Smith S.D., Turnadge C., Villeneuve S., Werner A.D., White N., Xie, Y. (2015). [Assessment of Adelaide Plains Groundwater Resources: Appendices Part I – Field and Desktop Investigations](#). Goyder Institute for Water Research Technical Report Series No. 15/32, Adelaide, South Australia. ISSN: 1839-2725. 240 pp. (Series of 3 reports).

## Lightly or Not Refereed Conference Papers

32. Cranswick, R.H., Bresciani, E., **Batlle-Aguilar, J.**, Cook, P.G., Batelaan, O., Banks, E.W. (2016). Mountain-front or mountain-block recharge? Unravelling the origin of water in basin aquifers. AGU Fall Meeting, Abstract H31C-1371. San Francisco, CA (USA).
33. **Batlle-Aguilar, J.**, Banks, E.W., Batelaan, O., Kipfer, R., Brenwald, M.S., Cook, P.G. (2016). Groundwater residence time and aquifer recharge in multilayered, semi-confined and faulted aquifer systems using environmental tracers. AGU Fall Meeting, Abstract H14D-06. San Francisco, CA (USA).

34. **Battle-Aguilar, J.**, Xie, Y., Cook, P.G. (2015). How direct flux measurements can improve infiltration estimates in ephemeral streams. AGU Fall Meeting, Abstract H23C-1602. San Francisco, CA (USA).
35. Batelaan, O., Banks, E.W., **Battle-Aguilar, J.**, Bresciani, E., Cook, P.G., Cranswick, R., Smith, S.D., Turnadge, C., Partington, D., Post, V., Pool, M., Werner, A., Xie, Y., Yang, Y. (2015). A multi-methodology for improving Adelaide's groundwater management. European Geosciences Union (EGU). Vienna (AUSTRIA).
36. **Battle-Aguilar, J.**, Harrington, G.A., Leblanc, M., Welch, C., Cook, P.G. (2013). Determining chemistry of groundwater discharge from multiple aquifers by longitudinal river sampling. 40<sup>th</sup> IAH International Congress. Perth, Western Australia (AUSTRALIA).
37. **Battle-Aguilar, J.**, Harrington, G.A., Leblanc, M., Cook, P.G. (2012). Determining origin and chemistry of groundwater discharge to the Mitchell River, Australia. GSA Annual Meeting and Exposition. Charlotte, NC (USA). INVITED ORAL PRESENTATION.
38. **Battle-Aguilar, J.**, Harrington, G.A., Leblanc, M., Cook, P.G. (2012). Determining groundwater discharge in large tropical rivers using environmental tracers: The example of the Mitchell River, Australia. NGWA Groundwater Summit: Innovate and Integrate. Garden Grove, CA (USA).
39. Cook, P.G., **Battle-Aguilar, J.** (2012). An experimental study of infiltration processes and groundwater recharge in ephemeral losing streams. NGWA Groundwater Summit: Innovate and Integrate. Garden Grove, CA (USA).
40. **Battle-Aguilar, J.**, Harrington, G.A., Leblanc, M., Cook, P.G. (2012). Geologic controls on groundwater discharge in large tropical rivers: An environmental tracers approach. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 14, 1154. Vienna (AUSTRIA).
41. **Battle-Aguilar, J.**, Cook, P.G. (2012). An experimental study of infiltration processes and groundwater recharge in ephemeral streams. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 14, 1153. Vienna (AUSTRIA).
42. Gardner, W.P., Harrington, G., Smerdon, B., Lamontagne, S., **Battle-Aguilar, J.** (2011). Helium (He) to identify the presence of ancient groundwater in river systems. GSA Annual Meeting. Minneapolis, MN (USA).
43. **Battle-Aguilar, J.**, Cook, P.G. (2011). Infiltration processes and groundwater recharge estimate in ephemeral losing streams at the transect scale. 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference. Cairns, Queensland (AUSTRALIA).
44. **Battle-Aguilar, J.**, Brouyère, S. (2011). Modelling groundwater flow and aquifer heterogeneity in urbanised environments with strong river interactions. 11<sup>th</sup> Australasian Environmental Isotope Conference and 4<sup>th</sup> Australasian Hydrogeology Research Conference. Cairns, Queensland (AUSTRALIA). BEST HYDROGEOLOGY POSTER AWARD.
45. Brovelli, A. **Battle-Aguilar, J.**, Barry, D.A. (2011). Modelling of biogeochemical transformations in riparian soils: Lessons learned from the Thur River revitalization experiment and open questions. River Corridor Restoration Conference – RCRC11, Ascona (SWITZERLAND).

46. Orban, Ph., Brouyère, S., Couturier, J., Wildemeersch, S., Goderniaux, P., **Battle-Aguilar, J.**, Dassargues, A. (2010). Assessment of nitrate trends in groundwater using the regional scale HFEMC approach. 7<sup>th</sup> International IAHS Groundwater Quality Conference. Zürich (SWITZERLAND).
47. **Battle-Aguilar, J.**, Brouyère, S., Dassargues, A., Morasch, B., Hunkeler, D. (2010). Influence of natural attenuation and river fluctuations on benzene dispersion in an alluvial aquifer subject to strong interactions with surface water. *In Proc. 7<sup>th</sup> International Groundwater Quality Conference*, Zurich (SWITZERLAND).
48. **Battle-Aguilar, J.**, Brovelli, A., Barry, D.A. (2010). Carbon and nitrogen dynamics in a soil profile: Model development. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 12, 5626-1. Vienna (AUSTRIA).
49. Brovelli, A., **Battle-Aguilar, J.**, Luster, J., Shrestha, J., Huber, B., Niklaus, P., Barry, D.A. (2010). Carbon and nitrogen dynamics in a soil profile: Model insights and application to a restored Swiss riparian area. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 12, 5630-1. Vienna (AUSTRIA).
50. Brouyère, S., **Battle-Aguilar, J.** (2009). Modelling groundwater and benzene discharge to a river from an alluvial aquifer subject to strong interactions with surface water. *Eos Trans. AGU*, 90(52). Fall Meet. Suppl., Abstract H13H-06. San Francisco, CA (USA). INVITED ORAL PRESENTATION.
51. **Battle-Aguilar, J.**, Brovelli, A., Porporato, A., Barry, D.A. (2009). Carbon, oxygen and nitrogen dynamics in a soil profile: Model development and application. *Eos Trans. AGU*, 90(52). Fall Meet. Suppl., Abstract H33D-0907. San Francisco, CA (USA).
52. **Battle-Aguilar, J.**, Brovelli, A., Porporato, A., Barry, D.A. (2009). Modelling of mechanisms affecting nitrogen and carbon cycles in soils subject to land use change. 7<sup>th</sup> Swiss Geoscience Meeting. Neuchâtel (SWITZERLAND).
53. **Battle-Aguilar, J.**, Brovelli, A., Porporato, A., Barry, D.A. (2009). Modelling carbon and nitrogen turnover in variably saturated soils. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 11, 8093-1. Vienna (AUSTRALIA).
54. **Battle-Aguilar, J.**, Pessel, M., Schneider, S., Tucholka, P., Coquet, Y., Vachier, P. (2009). Utilisation de la tomographie électrique pour l'étude de l'infiltration axysymétrique de l'eau dans le sol. 10<sup>èmes</sup> Journées d'Etudes des Sols. Strasbourg (FRANCE).
55. Orban, P., Brouyère, S., Couturier, J., Wildemeersch, S., Goderniaux, P., **Battle-Aguilar, J.**, Dassargues, A. (2009). Assessment of nitrate trends in groundwater using the regional scale HFEMC approach. Groundwater Summit and Groundwater Protection Council Spring Meeting. Tucson, AZ (USA).
56. **Battle-Aguilar, J.**, Brouyère, S., Dassargues, A., Diels, L., Vanbroekhoven, K., Hunkeler, D., Morasch, B., Halen, H. (2008). Hydrodynamic characterisation of a groundwater – surface water system and evaluation of BTEX, PAHs decay and heavy metals fate. 10<sup>th</sup> International conference on Soil-Water systems CONSOIL. Milan (ITALY).
57. **Battle-Aguilar J.**, Brouyère, S. (2007). Assessing groundwater surface water interaction and groundwater discharge in a contaminated site in an industrial, sub-urbanized area. 6<sup>th</sup> International IAHS Groundwater Quality Conference. Fremantle, Western Australia (AUSTRALIA).

58. Brouyère, S., **Battle-Aguilar, J.**, Goderniaux, P., Dassargues, A. (2007). The Finite Volume Point Dilution Method: A tracer technique for transient monitoring of Darcy fluxes. 6<sup>th</sup> International IAHS Groundwater Quality Conference. Fremantle, Western Australia (AUSTRALIA).
59. Brouyère, S., **Battle-Aguilar, J.**, Goderniaux, P., Dassargues, A. (2007). A new single tracer test: the Finite Volume Point Dilution Method (FVPDM). Theory, field application and model validation. ModelCARE, Calibration and Reliability in Groundwater Modelling, Credibility of Modelling. Copenhagen (DENMARK).
60. Brouyère S., **Battle-Aguilar, J.**, Goderniaux, P., Dassargues, A. (2007). The Finite Volume Point Dilution Method: A tracer technique for monitoring transient Darcy fluxes. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 9, 02145. Vienna (AUSTRIA).
61. **Battle-Aguilar, J.**, Organ, Ph., Dassargues, A., Brouyère, S. (2007). Identification of groundwater quality trends in a chalky aquifer threatened by intensive agriculture. International conference on Diffuse inputs into the groundwater: Monitoring, Modelling and Management. Graz (AUSTRIA).
62. **Battle-Aguilar, J.**, Orban, Ph., Dassargues A., Brouyère, S. (2006). Identification of groundwater quality trends in a chalky aquifer threatened by intensive agriculture. IAMG annual conference on Quantitative Geology from multiple Sources. Sart Tilman (BELGIUM).
63. Broers, H.P., Dubus, I.G., Bierkens, M., Visser, A., Brouyère, S., **Battle-Aguilar, J.**, Korcz, M. (2005). "Analysis of trends in groundwater pollutants: perspectives and challenges". 9<sup>th</sup> International conference on Soil-Water systems CONSOIL. Bordeaux (FRANCE).
64. **Battle-Aguilar, J.**, Coquet, Y., Tucholka, P., Vachier, P. (2004). Axisymmetrical water infiltration soil imaged by non-invasive electrical resistivity. European Geosciences Union (EGU). Geophysical Research Abstracts, Vol. 6, 01343. Nice (FRANCE).