

Review – Manuscript Number: HESSD 10: 6407-6444

Manuscript Title: Darwinian hydrology: can the methodology Charles Darwin pioneered help hydrologic science?

Authors: C. Harman, P.A. Troch

General comments

The authors present an outstanding manuscript which certainly is among the best opinion papers I read in the last years. It is very well written and assembles a large amount of valuable references. I explicitly appreciate that the authors distinguish between Darwin's theory (or even broader ecological science) and the methods he applied, which are valuable for all scientific disciplines. Since I am not an expert in the history of (biological) sciences, I cannot judge whether Darwin was really the first one to develop and apply the described set of methods and approaches – but besides Darwin's theories also his methodological achievements are certainly unquestionable. Reviewing Darwin's last book on "The formation of vegetable mould [...]" (1881), Feller et al. (2003) emphasize his role as precursor and/or founder of various scientific disciplines: ethology, soil ecology and pedology. Basing their work in relation to Harte (2002) is a good idea, since I agree that his rather vague notion of the "Darwinian" approach certainly needs more elaboration. And this elaboration is provided by the authors in an excellent way, while transferring Darwin's methodological approach from ecology to hydrology. Again, it's a pleasure to read this manuscript which has the potential to be an eye-opener for hydrologists.

Kind regards,
Boris Schröder

Detailed comments (in order of appearance):

No.	Chapter	Comment
1	2.2.1	Interestingly, Darwin's first publication on earthworms' activity is from 1840. So, his last book (1881) summarizes the results of more than 40 years of work and thinking.
2	2.2.3	The authors' thoughts show that the notion of "uniqueness of place" (Beven 2000) which often seems to hamper ecological or hydrological science in searching general patterns or theories can be ÜBERWUNDEN.
3	2.3	The idea of pattern-oriented modelling, which was developed in the field of ecological modelling (Grimm et al. 2005), might be of interested in this context.
4	3.1.1	Please see the discussion of filter in landscape ecology provided by Schröder (2006).
5	3.5.2 and 4.2	Please see the discussion of trait-based approaches for classification as well as the notions of response traits vs. effect traits, provided by Schröder (2006), which might be helpful in hydrology, too, cf. also Poff (1997) as well as the seminal paper of Lavorel & Garnier (2002) and Suding & Goldstein (2008).

References

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