

Referee Report

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Field-based estimation and modelling of distributed groundwater recharge in a Mediterranean karst catchment, Wadi Natuf, West Bank

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Overall assessment:

An important paper that contributes new approaches to the assessment of groundwater recharge in ungauged basins in semi-arid karstified regions. With a few, minor technical corrections the paper can be accepted.

Suggestions for technical corrections:

Line	Original	Recommendation	Remarks
56	When no other option than observations in the unsaturated zone are available, then groundwater recharge has to be equated with deep percolation from the soil cover into the aquiferous bedrock formation.	When no other options are available than observations in the unsaturated zone, groundwater recharge has to be equated with deep percolation from the soil cover into the aquiferous bedrock formation.	
62	Hartmann <i>et al.</i> , 2013	Hartmann <i>et al.</i> , 2012	Check references, lines 892-893
71	(Hrachowitz <i>et al.</i> , 2013; Sivakumar <i>et al.</i> , 2013).	(Hrachowitz <i>et al.</i> , 2013; Sivakumar <i>et al.</i> , 2013).	
86	(...) accounted for land use, soil and topography (but not geology) but calculated with parameters (...)	(...) accounted for land use, soil and topography (not geology) and calculated with parameters (...)	
95	As a challenge however, remains the correct and appropriate linkage and translation from form to function (...).	The correct and appropriate linkage and translation from form to function remains a challenge (...).	
96	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	Check references, lines 946-947: There is only one "Messerschmid <i>et al.</i> , 2019", no a and b
111	(Seibert and Beven (2009)).	(Seibert and Beven, 2009).	
117	Hartmann <i>et al.</i> , 2012b	Hartmann <i>et al.</i> , 2012	Check references, lines 892-893
118	(Dafny <i>et al.</i> , 2009, 2010)	(Dafny, 2009; Dafny <i>et al.</i> , 2010)	
138-139	Binley and Beven (2003) added that such an intelligent design remains a learning process that may start with insufficient data and adds data as required by the application and (...).		Something is missing at the end of the sentence.

139	Seibert & Beven, 2009)	(Seibert and Beven, 2009)	
143	(see Fig. 2a)	(see Fig. 1)	
149-150	the basin rapidly became one of the single-largest sources of Israeli water supply	the basin rapidly became one of the single-largest sources for the water supply in Israel	
167	Abusaadah (2011)	Abusaada (2011)	Check references, lines 807-808
199	(of 10 x 18m plot size)	(of 10m x 18m plot size)	
203	Hartmann <i>et al.</i> (2012)		Check references, lines 892-893
220	However, again, their soil parameters and time series data of soil saturation were (...)	However, their soil parameters and time series data of soil saturation were (...)	
242	On the one hand, and at (...)	On the one hand, at (...)	
267-268	(...) were complemented by two Automatic weather stations within the catchment by this study.	(...) were complemented during this study by two Automatic Weather Stations within the catchment.	
275	(...) of the map (2a) and (...)	(...) of the map (2b) and (...)	
281	Wadi Natuf (Fig. 2a, Table 1)	Wadi Natuf (Fig. 2b, Table 1)	
285	(Fetter, 1994)		Reference missing in references list
312	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	Check references, lines 946-947: There is only one "Messerschmid <i>et al.</i> , 2019", no a and b
344	(...) (1985) - see section 3.2.2 were collected (...)	(...) (1985) - see section 3.2.2 - were collected (...)	
347	(IMS, 2015)		Check reference, line 911-912: No year 2015 given.
381	(spring data coverage see, Table C1)	(spring data coverage, s. Appendix C, Table C1)	
400	soil thickness matrix (Table D1)	soil thickness matrix (Appendix D, Table D1)	
403	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	Check references, lines 946-947: There is only one "Messerschmid <i>et al.</i> , 2019", no a and b
408	(...) documented in Table E1 and Fig. E1	(...) documented in Appendix E, Table E1 and Fig. E1	
427	(...) presented in Table F1	(...) presented in Appendix F, Table F1	
474	used the individual annual rainfall coefficients (RC)	used the individual annual recharge coefficients (RC)	Check if "rainfall" or "recharge" coefficient.
493	(Two exceptions are found here:	Two exceptions are found here:	
499	(compare soil depth matrix, Table D1)	(compare soil depth matrix, Appendix D, Table D1)	

534	Fig. 6		<p>If it is technically possible, it will be good to distinguish more obviously between P and DP also within the legend.</p> <p>Since the x-axis is not a timeline, it might be better not to draw lines between some of the data, but rather use a different signature or chart type.</p>
544	Fig. 7		<p>If technically possible it would be good to stretch the diagram over the full page width.</p>
558	(Table B3)	(Appendix B, Table B3)	
595	see Table C1	see Appendix C, Table C1	
604	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	<p>Check references, lines 946-947: There is only one “Messerschmid <i>et al.</i>, 2019”, no a and b</p>
616	In sum, for most years, (...)	For most years, (...)	
625	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	<p>Check references, lines 946-947: There is only one “Messerschmid <i>et al.</i>, 2019”, no a and b</p>
630	see Table D1	see Appendix D, Table D1	
646	manly	mainly	
691	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	<p>Check references, lines 946-947: There is only one “Messerschmid <i>et al.</i>, 2019”, no a and b</p>
695	(see Fig. G1)	(see Appendix G, Fig. G1)	
707	All in all, (...)	Overall, (...)	
707	(Table B1)	(Appendix B, Table B1)	
721	shown in Tables B1 and B2	shown in Appendix B, Tables B1 and B2	
732	Table H1	Appendix H, Table H1	
797	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	<p>Check references, lines 946-947: There is only one “Messerschmid <i>et al.</i>, 2019”, no a and b</p>

813-814	Allocca <i>et al.</i> (2014)		Not found in the manuscript.
815-816	Allocca <i>et al.</i> (2015)		Not found in the manuscript.
831-832	Bradford <i>et al.</i> (2002)		Not found in the manuscript.
865-866	Freeze (1969)		Not found in the manuscript.
869-870	Goldscheider <i>et al.</i> (2007)		Not found in the manuscript.
882-883	Gunkel <i>et al.</i> (2015)		Not found in the manuscript.
935-937	Messerschmid (2003)		Not found in the manuscript.
946-947	Messerschmid <i>et al.</i> (2019b)	Messerschmid <i>et al.</i> (2019)	There is only one “Messerschmid <i>et al.</i> , 2019”, no a and b
950-951	Nativ <i>et al.</i> (1995)		Not found in the manuscript.
950-951	Radulović <i>et al.</i> (2011)		Not found in the manuscript.
963-965	Rosenzweig <i>et al.</i> (1972)		Not found in the manuscript.
970-971	Sanz <i>et al.</i> (2011)		Not found in the manuscript.
981-982	Shachori <i>et al.</i> (1965)		Not found in the manuscript.
1013-1014	Weiss <i>et al.</i> (2007)		Not found in the manuscript.
1040	technical equipment an interpretation problems	technical equipment and interpretation problems	
1116	average of seven years is 101.7% the average of all 44 years	average of seven years is 101.7% of the average of all 44 years	
1141	Messerschmid <i>et al.</i> , 2019b	Messerschmid <i>et al.</i> , 2019	Check references, lines 946-947: There is only one “Messerschmid <i>et al.</i> , 2019”, no a and b