

Interactive comment on “Predicting soil water repellency by hydrophobic organic compounds and their vegetation origin” by J. Mao et al.

Anonymous Referee #2

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General comments The study describes an attempt to predict soil water repellency based on specific compounds (compound classes) contents and significant ratios of these compounds by using WR soils under different vegetation. From a biogeochemistry point of view the approach and results obtained have a good scientific impact and are useful. The results concerning the influence of AS fraction C20-C30 alkanols in SWR are interesting, although n-alkanols have been shown to be dominant compounds in total lipid extracts of water repellent eucalypt soils. Some data, respectively results are missing and new must be included in the paper to make it suitable for publication. No enough emphasis has been placed on the other soil properties and characteristics influencing SWR and supporting the discussion section and the conclusions section. No relation has been made between WDPTs of the soil samples as

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a measure of SWR and the dominant compounds in these samples. It has not been made clear by the authors why these specific compounds have been chosen as markers, moreover these compound classes are common constituents of TLE of any soil. There are remarks concerning the extraction procedure, quantification procedure and inclusion of new data to support the statements made by the authors. There are already published data providing evidence that SWR can be eliminated by using milder solvents that don't require rupture of ester bonds, even hot water. A mention to these should be made. I recommend publication after major revision. Specific comments and questions are given below:

p. 155 line 16 (Atanassova and Doerr, 2010, as well) p. 158 (lines 1-4) Sequential extraction has been previously used by other authors (Franco et al., 2000) and recently Atanassova & Doerr, 2010 where Accelerated Solvent Extraction (ASE) method is used with a similar solvent ratio. A mention of a modification or variation of this method by using conventional Soxhlet should be made. Total yields of extracts in the sequential procedure (D, AI, AS) should be presented and these data involved later in the Discussion section relating SWR (WDPTs) and yields to support statements.

p. 158. l. 24 Quantification has been roughly done or explained in the text. If this standard (squalane) has been used in other studies, it should be explained in detail what RRF to the lipid classes quantified has been used. Approximation and use of peak area integration does not lead to accurate results. p. 179 Table 1. WDPTs should be given in antilog instead of log, e.g. -0.48 (0.33 s) for better clarity to the actual water repellency of the samples. p. 159-160 At least two GC TIC chromatograms (of the most and the least water repellent soils and 1-2 of the vegetation) should be presented as evidence in a Figure to see the relative abundances of the compound classes quantified. Are the compound classes quantified in this study the most abundant (dominant) compounds in the extracts? No mention of other abundant compounds is given. p. 161. No references are provided of other authors who identified these compounds in vegetation and soils, e.g. l. 9 (?), l. 13 (?), l. 24 (?) p. 162 l. 10 Ref? p. 162 n-alkanols were

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first detected and implicated to influence SWR by Atanassova & Doerr, 2010, citation is required. p.165 l.1-3 correct grammar. p. 166 l. Polar compounds (sugars) and other short chain dicarboxylic acids were shown to be more abundant in less water repellent soils and are also implicated to affect WR (See Atanassova & Doerr, 2010). The higher relative Comp/TOC concentrations of alkanes, alkanols and fatty acids have been implicated to affect SWR in the above mentioned study, as well. p.167 l.5 The phrase: “the positive relations between the absolute amounts of all the compound groups and SWR are most likely?? following the significant positive relation between TOC and SWR” What does “most likely” imply?. What’s the correlation between TOC/SWR of the samples. What is the corr. coeff. R? p.168 l.19. The fact that there are no alkanes in the AS fraction in a sequential extraction is logical, not unexpected. GC-TIC of a sequential extraction at least of 1 soil (probably the most repellent should be shown). p. 171 l. 12-14. That has been shown in other studies. References should be given. p.172, l. 1-3 correct grammar. Has this correlation and WDPTs been determined? p.172, l. 17-18 The correlation between TOC and SWR should be provided to sustain this statement. p.172, l. 19 The sentence: “. . .while the long-chain markers rarely have significant positive relations with SWR” . What does “rarely” mean. No correlation coefficient is provided for fatty acids > C22, it means no significant correlation, at all. p. 184. Figure 2 text on axis should be enlarged

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