ID	Reviewer Comment	Changes to manuscript / justifications
1	The Monte Carlo simulation requires substantial computational capacities for error propagation if the input DEM has a high spatial resolution (Gesch et al., 2020; Temme, Heuvelink, Schoorl, & Claessens, 2009) or when different cost functions are used comparatively for modelling the LCP. The number of modelled scenarios to be computed will moreover be increased if other factors, such as incorporating barriers with various impedance values, are included in modelling movement.	I have expanded and made reference to this in the updated manuscript. See lines 79-82 and 88-93.
2	The following reference (Verhagen, Nuninger, & Groenhuijzen, 2019) could be added in the paragraph extending from lines 22-33 when discussing the role of the DEM, the slope and the key factors in LCP modelling.	Added reference
3	Lines 60-63: It is worth highlighting that the Monte Carlo Simulation could also be applied to DEM with high accuracy and high spatial resolution. See for instance the study conducted by Gesch et al. (2020). As has been stated by Temme et al. (2009), "A high-resolution DEM may still have a greater uncertainty than a low resolution DEM if we are less certain of its attribute values".	Added to line 79-82
4	A study conducted by Herzog & Yépez (2015) on the impact of DEM on archaeological GIS studies could be added in lines 64-71, where the author highlights the rarity of archaeological studies discussing the vertical error and its impact on LCP modelling.	Added reference and reflected that, although rare, Herzog et al. have spoken about vertical error / and incorporated into their analysis. See Line 83-93
5	Methodological Proposal: Temme et al. (2009) argue that simulated DEMs are not geomorphologically realistic as they have more local variation in altitude, therefore steeper slopes. In their study, the simulated DEMs were modified using sink removal algorithm and Monte Carlo analysis was performed on both unfilled and filled DEMs in order to assess the influence of sink removal on uncertainty propagation. Has the author taken into account this matter and its effect on LCP modelling?	Thank you for this reference and comment – I was not aware of this issue. I have now corrected for this by applying a fill sinks algorithm to the simulated DEMs. See Lines 229-232
6	Lines 96-97: Perhaps it would also be useful to explain in a few sentences the concept of spatial autocorrelation (see Temme et al., 2009) as it could help provide a better understanding of the usefulness of the neighborhood autocorrelation filter method.	Added explanation of spatial correlation. See lines 117-120
7	Lines 203-205: It would be better to evaluate the RMSE of the SRTM DEM of the study area based on	To overcome this limitation (and to not compute an RMSE for the study

	a number of reference points (datum points) rather than relying on consensus view of a minimum RMSE value equal to 9.73 m worldwide.	area, of which I felt would detract from the focus of the research), I have used the Ordnance Survey 50m DEM (4m RMSE, rather than 9.73m). I have justified its use in Lines 220-225
8	Lines 227-229: The author states that: "Effective slope, which takes into account the direction of descent, was computed in leastcostpath by calculating the difference in elevation between cells and their sixteen neighboring cells". Is this based on the effective slope equation developed by Yu, Lee, & Munro-Stasiuk (2003)? In this case, the distance between cell centers should be also taken into account in the calculation of the slope value (See also Herzog 2014).	I have expanded on this to make note that the distance between cell centres is accounted for. Also added the Yu et al. (2003) reference of which the method makes use of. See lines 238-240
9	Lines 239-240: It is stated that the maximum distance from the known location of the High Street Roman road to the computed LCP from the south-to-north is 85% less than the maximum distance of the LCP calculated from north-to-south. In lines 292-294 the author also notes that the LCP from north-to-south is less accurate with 85% greater maximum distance than the LCP from south-to-north. Would it be possible to clarify how this percentage was calculated? Based on the numbers exposed in table 1 the maximum distance from the Least Cost Path calculated from North to South to the known location of the High Street Roman road of is 825.93 m while the maximum distance from the Least Cost Path calculated from South to North is 332.97 m. Thus, the percentage decrease from 825.93 to 332.97 is 59.68% while the percentage increase from 332.97 to 825.93 is 148.04%.	Apologies, I had calculated the percentage difference rather than percentage change. I have now corrected for this. Maximum distance of LCP from north-to-south is 838.79m Maximum distance of LCP from south-to-north is 230.92m This results in the LCP from south-to-north being 607.68m closer to the Roman road (I have removed any reference to percentage change as I feel this is not needed – the difference in LCP accuracy is apparent)
10	It would be preferable to add a scale and a north arrow to figures 6-8 since the author designates the computed LCP according to cardinal directions.	Added scale and north arrow to Figures.
11	it is not possible to truly conduct a LCP analysis probabilistically, as there is by definition only one least cost path. Moreover, it is difficult to discern how this article can affect the application of LCP in archaeological interpretation.	I have expanded and argued how this article can affect the application of LCP in archaeological interpretation. See lines 48-57. I have also tried to clarify that, although there is only one least cost path, the least cost path is a product of the DEM (and all of its error). By incorporating vertical error, the DEM is just as correct as when vertical error was not introduced. Therefore, the LCP produced is just as valid as the

		LCP produced from the DEM without vertical error. As each LCP is an output from a different, but equally correct, realisation of the DEM, the LCP can be viewed probabilistically, whereby some LPCs and more likely than other LCPs. Due to this, is it more sensible to base archaeological interpretations on the location of the LCPs that are more likely to occur (of which I've designated the term 'most probable location of the 'true' LCP')
12	The approach the authors have outlined can be used to identify a probabilistic range of results. It would be useful if the author illustrated how this probabilistic range of results can shape archaeological interpretation. How does realizing there is a range of possible distances affect our understanding of the Roman Road network? What does a 400-meter difference mean from an interpretative standpoint? What do these probabilistic thresholds mean for the interpretation of LCP results?	I have tried to focus on how the probabilistic range of results can shape archaeological interpretation through the use of a postdictive approach, whereby the LCP is used to understand the factors (in this case on minimising the difficulty when moving up and down slope) that may have influenced the location of the Roman road. See Lines 309-318 for issues with archaeological interpretation based on the single LCP realisation. See Lines 335-352 for archaeological interpretation based on the probabilistic LCPs. I have also removed the probabilistic thresholds component of the manuscript as it offers little to how archaeological interpretations may change – rather it was just a demonstration that the probabilistic LCPs can be filtered to areas of higher probability (of which is visible from the probabilistic LCPs anyway)