

Interactive comment on “Altered phenology and temperature sensitivity of invasive annual grasses and forbs changes autotrophic and heterotrophic respiration rates in a semi-arid shrub community” by M. Mauritz and D. L. Lipson

Anonymous Referee #2

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General comments:

This study compared soil respiration (and its autotrophic and heterotrophic components) and in an invaded and non-invaded coastal shrub ecosystem. The authors measured soil respiration with automated chambers over two growing season, and partitioned soil respiration with 30 cm deep soil collars to remove the autotrophic contribution. Temperature and moisture relationships as well as total C fluxes were quantified. The study is interesting in that invasive plants (and particular annual grasses) have affected large areas, yet their influence on the carbon budget is not well quanti-

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fied. Additionally, this is interesting because the influence of altered-phenology has not been extensively quantified with respect to soil respiration.

In general, the writing in this manuscript is acceptable, however not as concise as it could be for the amount information provided. I recommend a broader literature review and a double check that references are being cited appropriately. The manuscript would benefit from focusing the take home points and improving the data display. I agree with reviewer 1's assessment that the author's are inferring causality throughout the manuscript, without sufficient data (such as a gradient or manipulation). I also agree that the analyses of temperature and moisture relationships are quite basic and could be improved.

P6336 L10 – add time units - g C m⁻² per year? L14 – “invasion increase temperature sensitivity in R_t and R_h when wet and decreased when dry” What timeframe are you referring too, daily, seasonal temperature sensitivity? L15 – How can the altered temperature sensitivity be due to phenology of invasives if R_a temperature sensitivity is not altered as well?

P6337 L3 – on an annual basis L15 – R_a is often younger C than R_h , but not always. This statement should be reworded.

P6338 L10 – R_h and R_a partitioning when dry is system dependent, check your references are incorrect. In annual plant ecosystem, this is true because all annuals are dead. But in a perennial plant ecosystem, often the R_h is more sensitive to moisture than R_a . . . thus R_t is usually dominated by R_a when dry because plants have roots that can get water from depth, where as the majority of microbes are in the upper soil layers, and cannot access water at depth.

L13 – This study was done on perennial grasses, not annual – it is in the title of the paper. Increase R_a with respect to what?

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Equation 1 should be: $R_a = R_t - R_h$

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Unnecessary text on data quality control.

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L8 – “invaded areas became hotter than shrubs” this is a problem throughout the manuscript, shrub areas, plots, or chambers should be used.

Subsection headers, for example “3.2 Invasion increased respiration rates” should be less causal for example “Greater respiration rates in invaded areas”

Figures – One multipanel figure with R_t, R_h, R_a – soil temp – and soil moisture would be informative instead of two separate figures and no time series of temperature. Fig 1,3 – what do the grey and white areas represent? Fig 5 – why not do the temperature and moisture analyses with R_a and R_h , instead of R_t and R_h . Fig 7 – connect symbols with lines

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