

Interactive comment on “The dynamics of cultivation and floods in arable lands of central Argentina” by E. F. Viglizzo et al.

E. F. Viglizzo et al.

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Comment of REF 2 (D. Le Maitre): The second problem I have is with anomalies in the data which also need explanation. For example groundwater levels in the lowlands fluctuate markedly from 1978-1987 despite a lack of similar variations in rainfall. There is also a drop from 1986-1987 despite an increase in rainfall. The lowland groundwater levels do not respond at all to variations in rainfall from 1998 onwards. This is despite a decrease in the cultivated area which should have increased groundwater levels if their hypothesis holds. There are obviously things happening in the catchment, and to groundwater levels, which are not the simple result of rainfall or changes in cultivation and the authors need to consider how to deal with them. For example, are these anomalies consistent over all the sub-catchments (boreholes) or confined to a few of

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them? Could any of them be due to groundwater abstraction?

Reply from Carreño L.: In my previous reply to Referee 2 comment, I stated that: ...no correlation was detected in lowlands, and this could be interpreted as follows: i) in relation to highlands, water tables in lowlands were consistently higher and closer to surface; so they inevitably were less sensitive to respond to precipitation changes; ii) because of their lower topographic position, lowlands received large amounts of runoff water from highlands (probably exceeding that from rainfall water), which accumulated in a system of interconnected lagoons. Given that lagoons are a major source of water, they could explain high water tables in lowlands, decoupling groundwater from local rainfall supply; iii) subsurface water movements from highlands could make an additional contribution to water table rising in lowlands. So, I believe that the same arguments are valid to explain the anomalous response of groundwater to variations in rainfall from 1998 onwards, and the lack of response of groundwater to cultivation in lowlands. This last aspect is clearly shown in Figure 6b, confirming the consistency of Referee 2 comment. On the contrary to the expected homogeneous behavior of districts in highlands, districts in lowlands showed a chaotic behavior.

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