

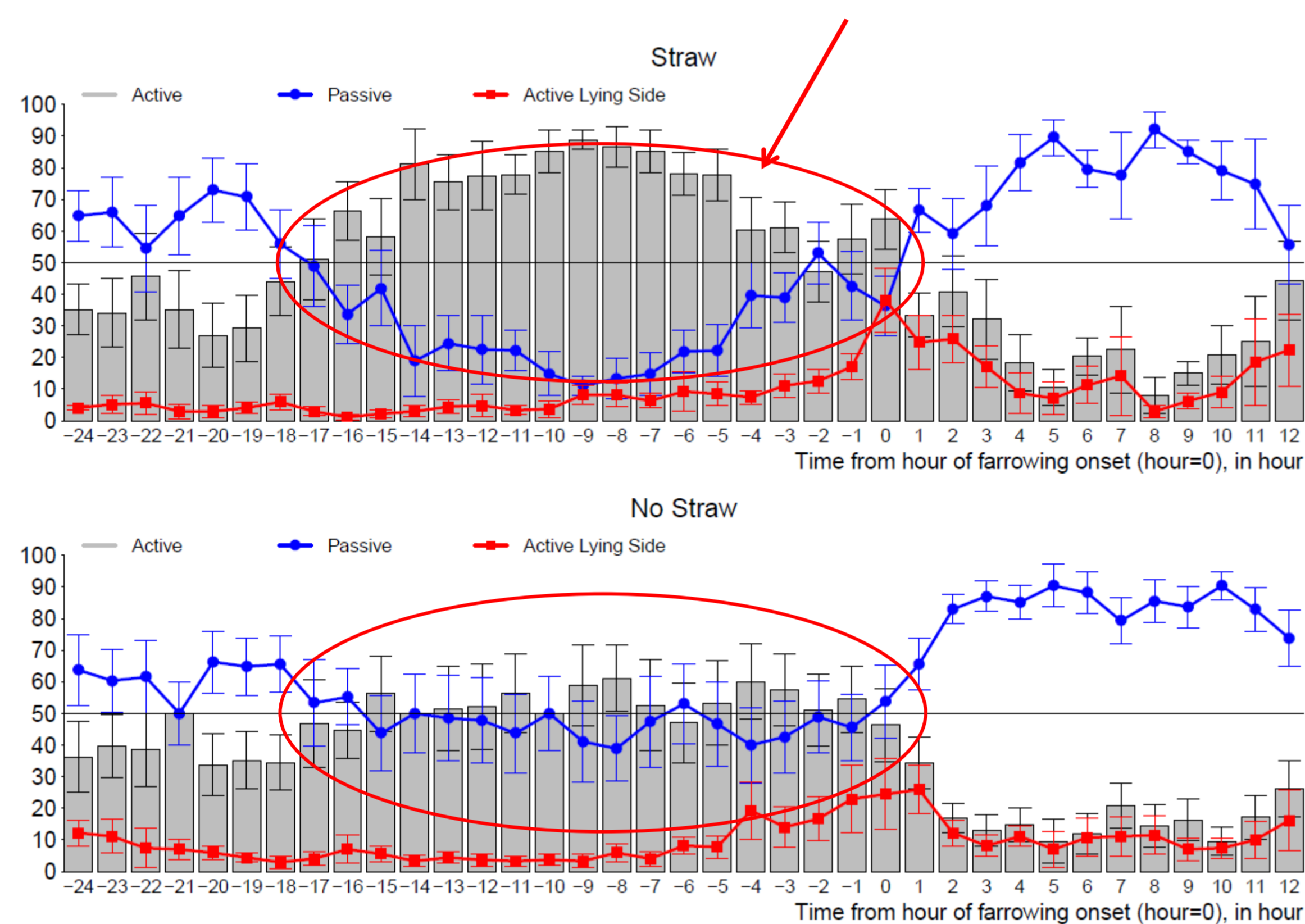
Monitoring the nest building and parturition progress using acceleration data

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Findings

- The intensity of the **pre-partum high activity** is higher for sows that received straw.
- All sows showed a significant increase of Lying Active behaviour at the approach of farrowing.
- The last hour of the pre-partum high active behaviour and the increase of the Lying Active behaviour characterize the **onset of farrowing**
- A reduction of the number of activity shifts characterizes the **end of farrowing**.
- No significant difference was observed in the activity of sows farrowing in the daytime vs at night.
- A longer pre-partum high active period is associated with more long birth intervals.

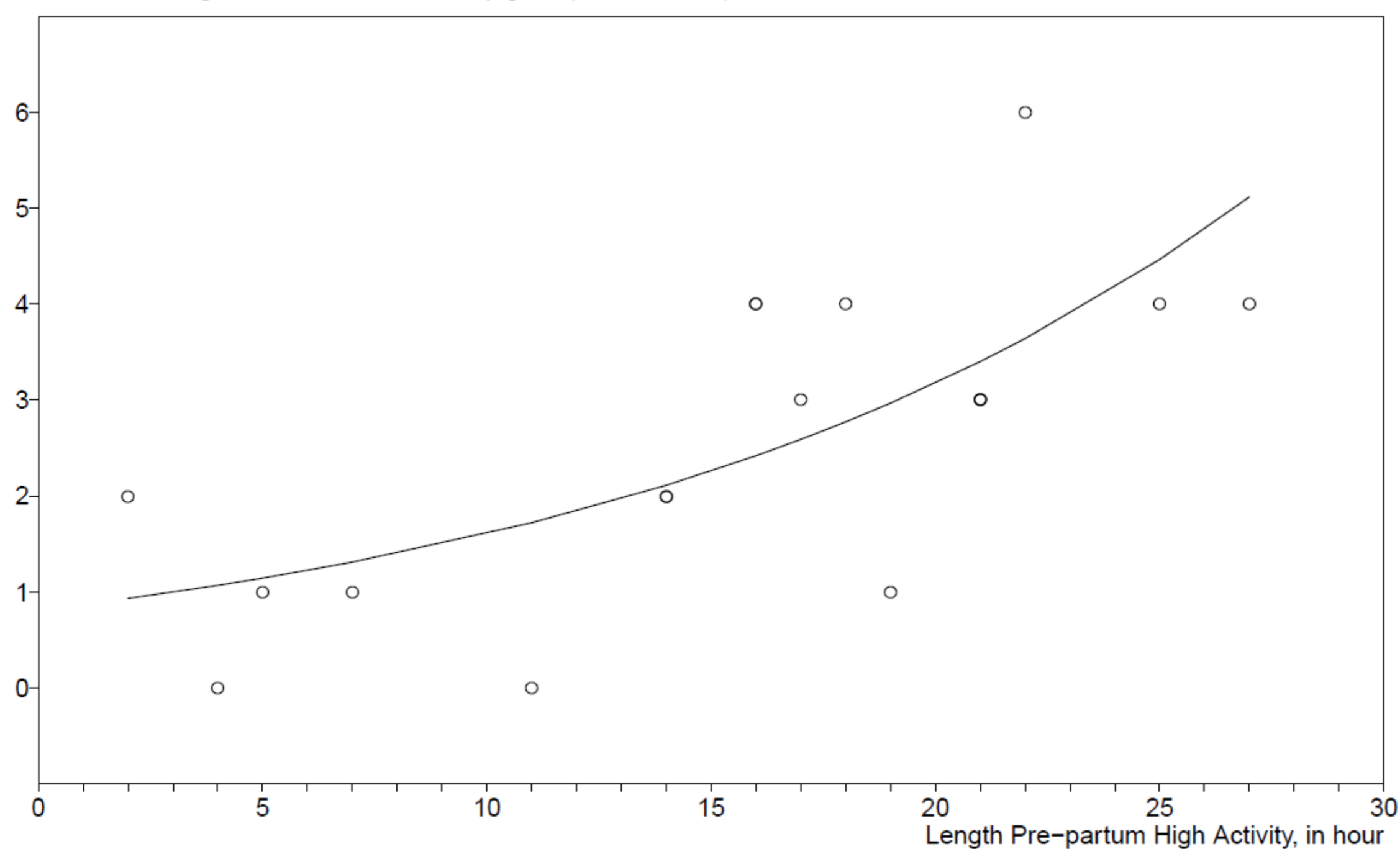
The horizontal line (50%) indicates the threshold used to define the period of **pre-partum high activity**.



Averaged percentage of two-min series per hour (\pm standard error), classified as Active, Passive, or Active Lying, for group Straw (top panel) and Non Straw (bottom panel). The horizontal axis indicates the time, in hour, compared to the onset of farrowing (h0).

The long intervals between born piglets are intervals longer than three times the median; and modeled using generalized linear models. -> Longer pre-partum high active period is associated with more long birth intervals.

Number of long intervals between born piglets ($> 3 \times$ median)

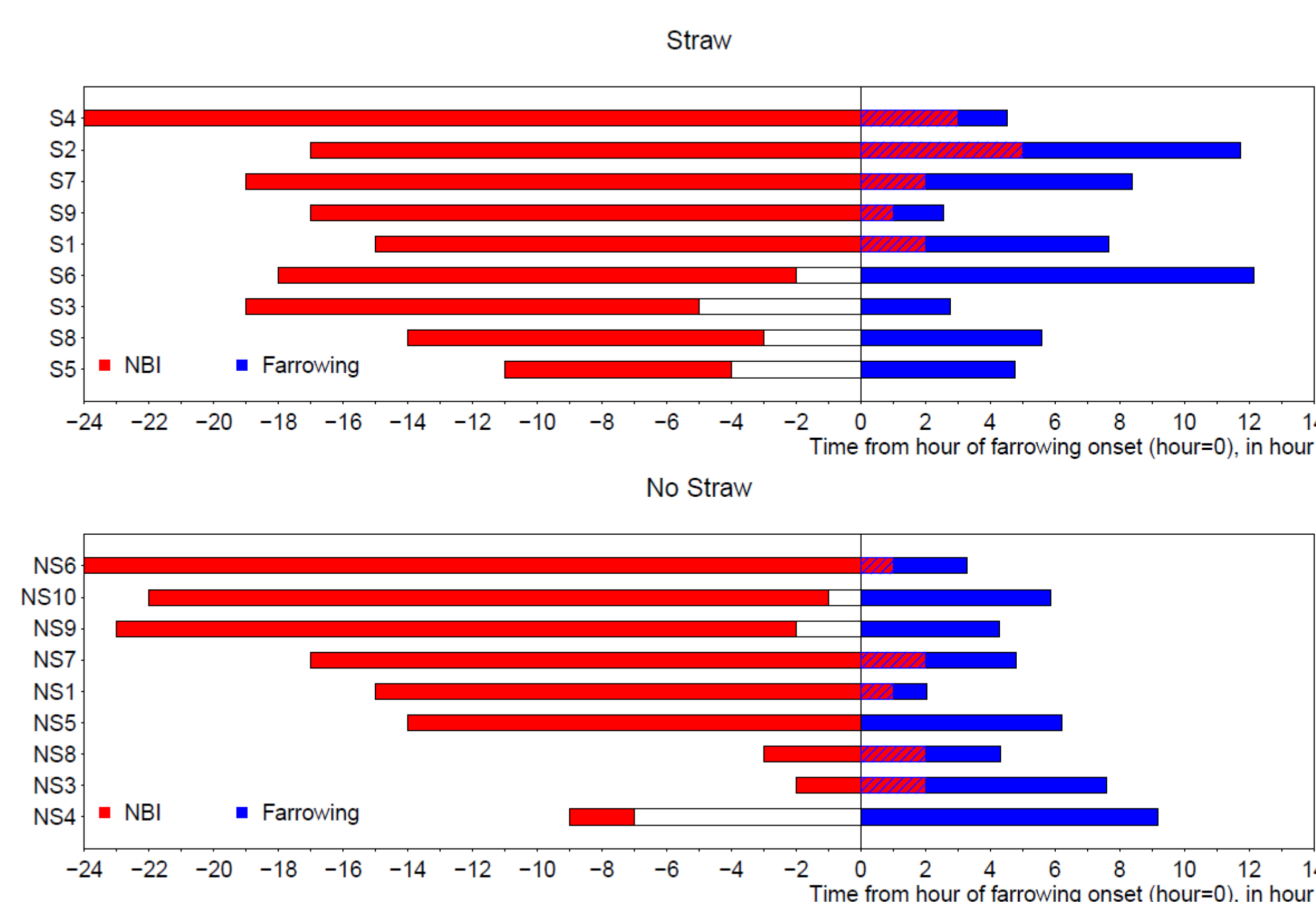


Number of long intervals between born piglets as a function of the length of the pre-partum high active behaviour. The regression line is the exponential of the fitted values from the Poisson regression.

Methods

A method to monitor nest building and farrowing activities using activity types classified from acceleration data is suggested. The progress of farrowing (start, end and birth of each piglet) is analyzed for 19 sows housed in crate: half was provided with Straw, and half had No Straw.

The **pre-partum high active behaviour** is defined as the hours when the sows performed more than 50% active behaviour per hour, allowing for one hour of resting. It is characterized by its **duration, intensity** and its **last hour** as compared to the onset of parturition.



Duration of the pre-partum high activity (red) and of farrowing (blue) according to the onset of farrowing (h0), for each sow of group Straw (top) and group Non Straw (bottom). Results are presented according to decreasing duration of the pre-partum high activity (red). The duration of farrowing is indicated in blue and the red dashed lines indicate hours of high activity during farrowing.

For the group Straw, sows having the longest pre-partum activity tend to be active also in the very first hours after the onset of farrowing (red dashed lines during farrowing), whereas sows with less pre-partum activity have an interval (2 to 5 hours, in white) between the last hour of high activity and the onset of farrowing. This pattern is not confirmed for sows with No Straw: two sows less active pre-partum (NS3 and NS8) are also active for a couple of hours after the onset of farrowing.

Perspectives

- The use of classified activities obtained from automatically collected acceleration data is promising to monitor sows' activity around farrowing, with the advantage of being less time consuming than the analysis of video recordings.
- Perspective of application of the method includes a better supervision of farrowing which could lead to a reduction of piglet mortality.