UNIVERSITY OF HOHENHEIM

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An alternative strategy for combining likelihood values in Bayesian calibration to improve model predictions

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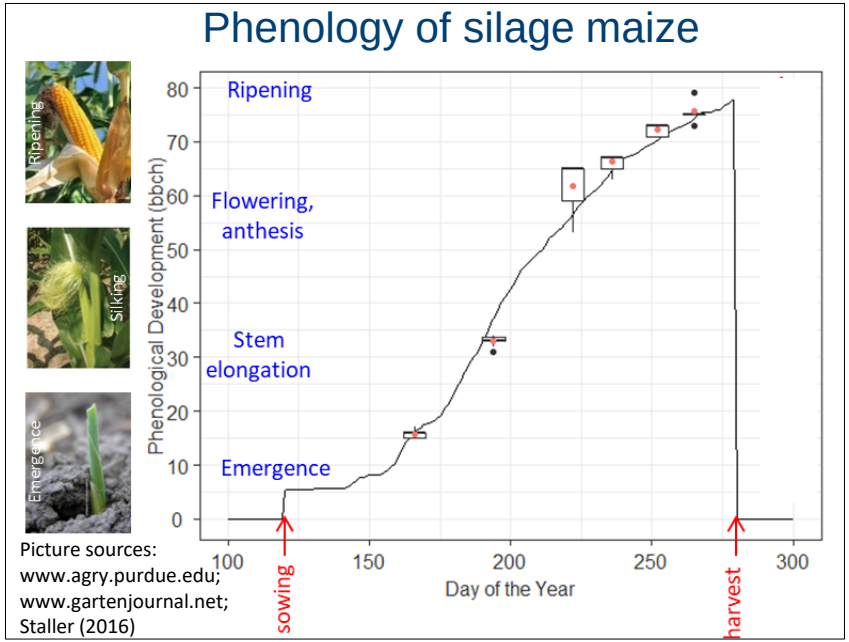


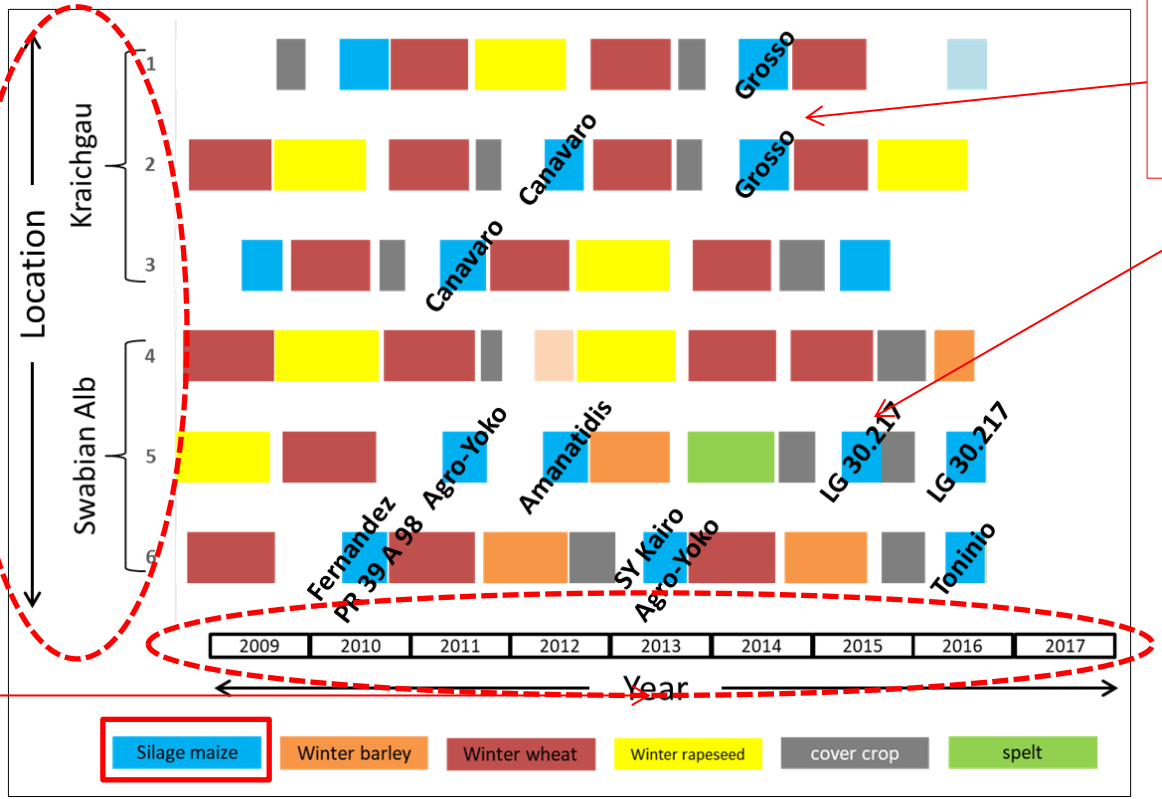
SimTech

INTEGRATED HYDROSYSTEM MODELLING

International Research Training Group 1829

Calibration leads to erroneous parameter estimates when the model has errors

This leads to unreliable model predictions!

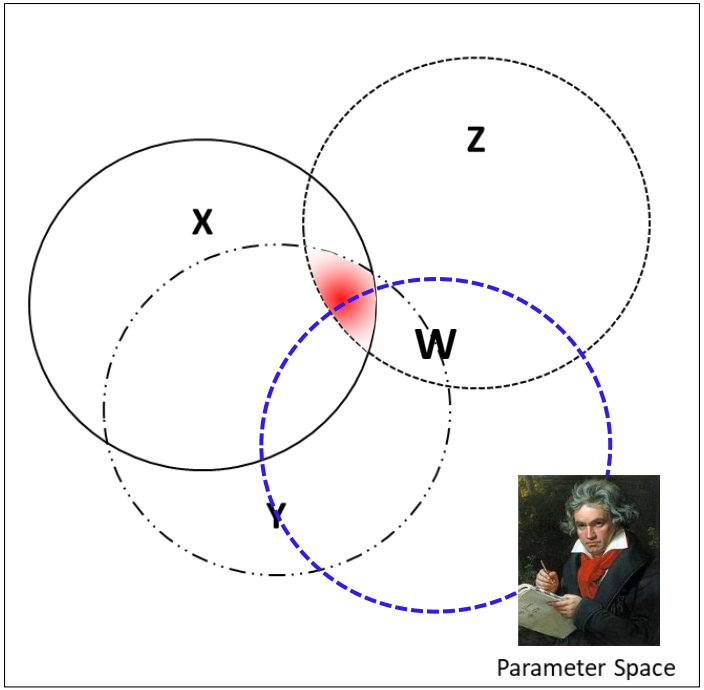


Different cultivars of silage maize

Different environments

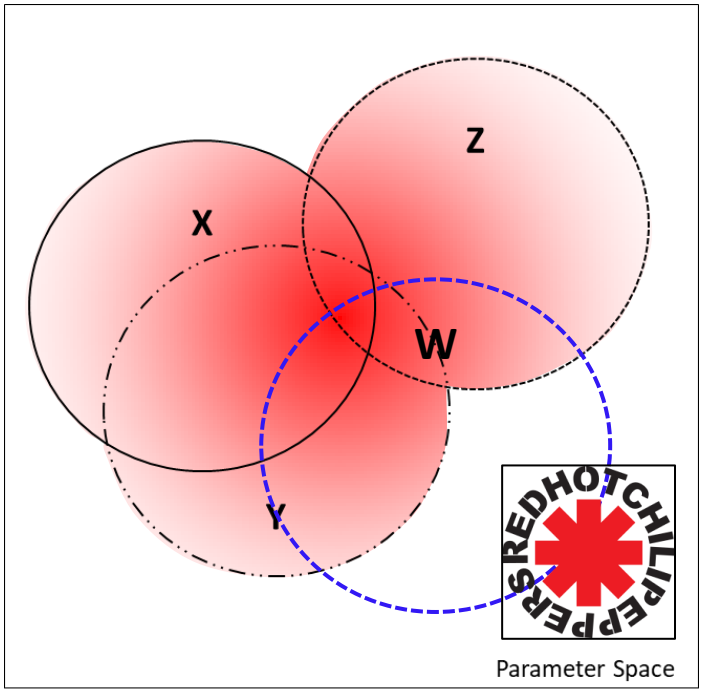
An alternative calibration strategy could result in reliable parameter estimates for prediction

‘Classical’ AND



high
Posterior probability density
low

‘Alternative’ OR

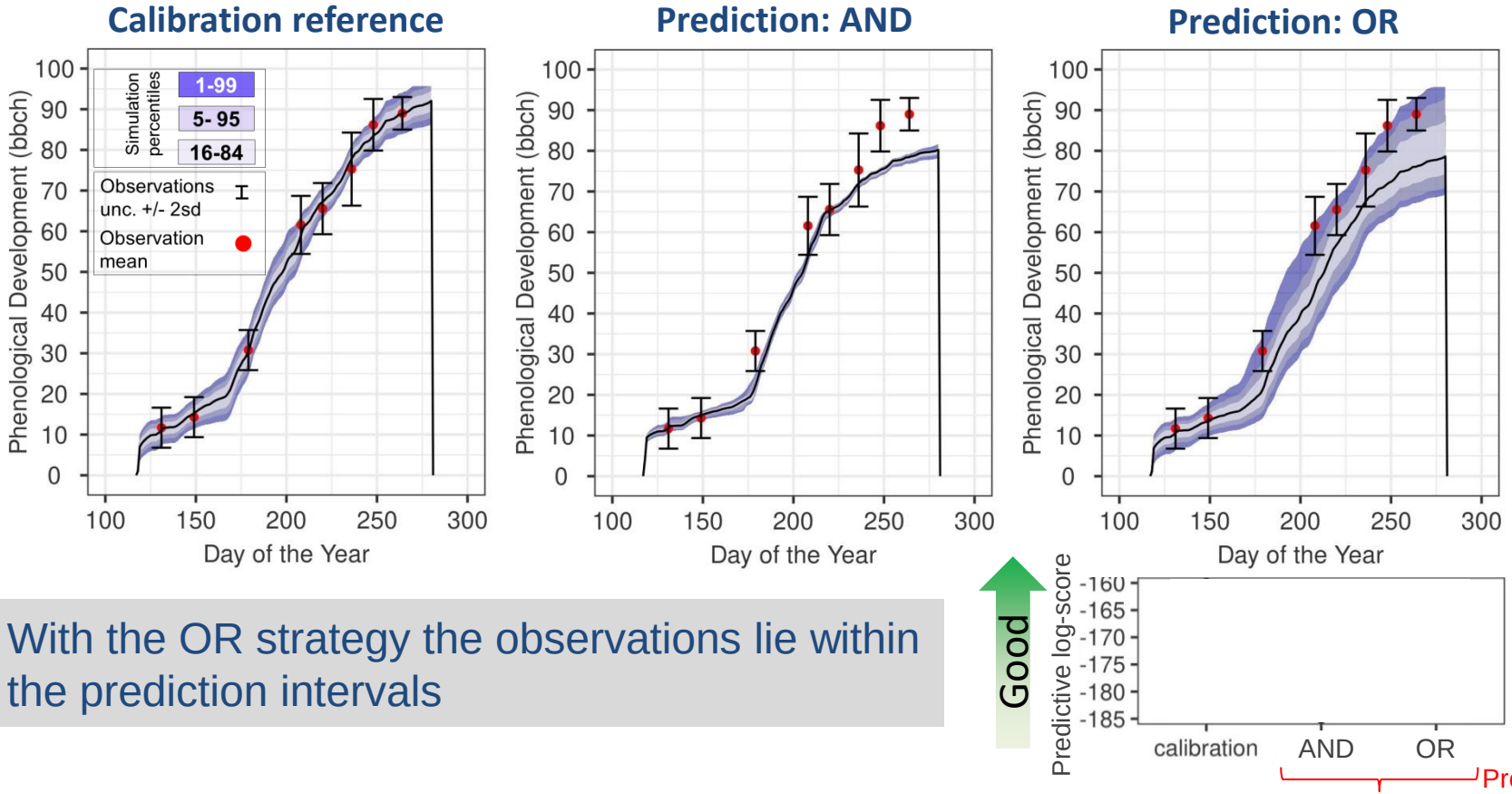


P(X|θ) AND P(Y|θ) AND P(Y|θ)

P(X|θ) OR P(Y|θ) OR P(Y|θ)

Beethoven, RHCP logo : wikipedia.org

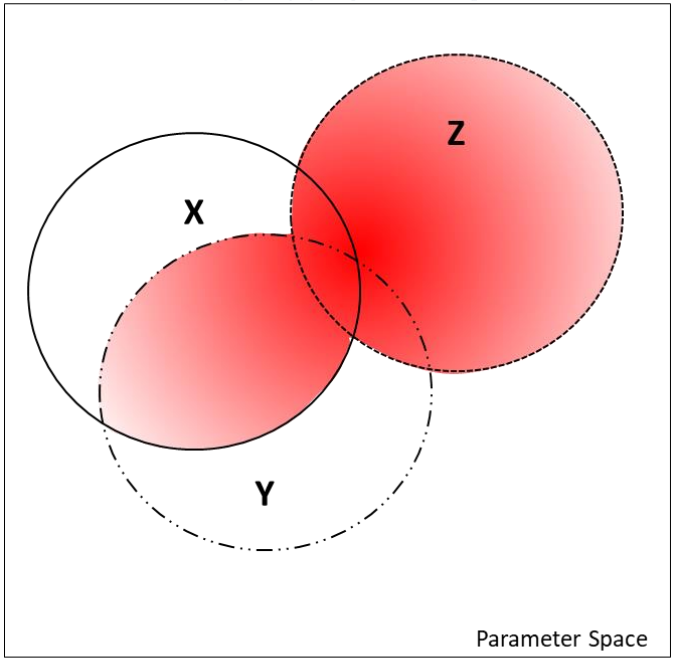
OR strategy results in conservative but reliable predictions



With the OR strategy the observations lie within the prediction intervals

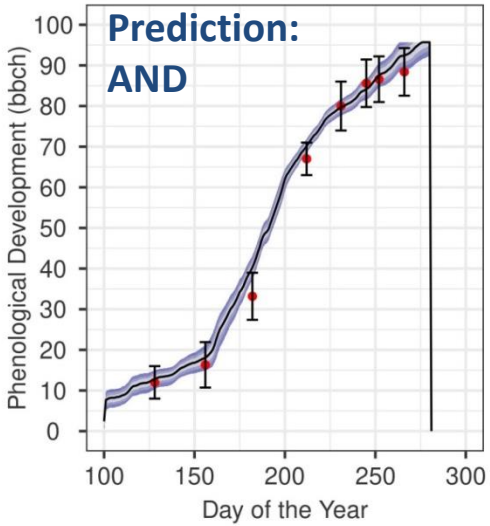
An intermediate AND-OR strategy may result in an better solution

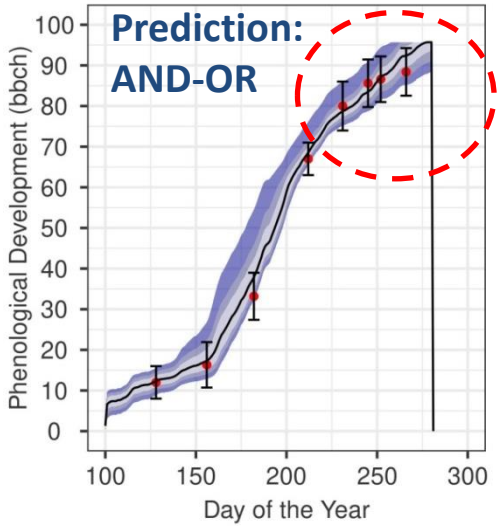
'Alternative' AND-OR

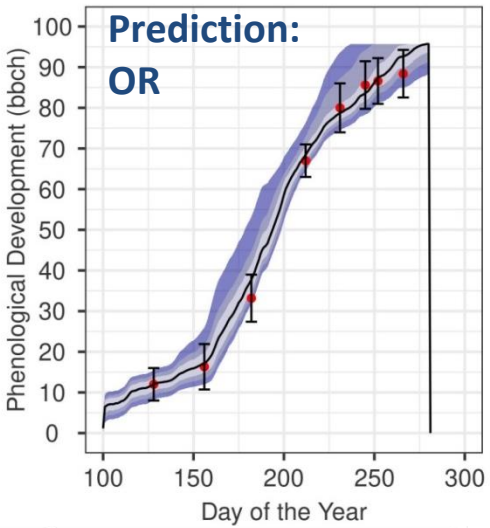


(P(X|θ) AND P(Y|θ)) OR P(Z|θ)

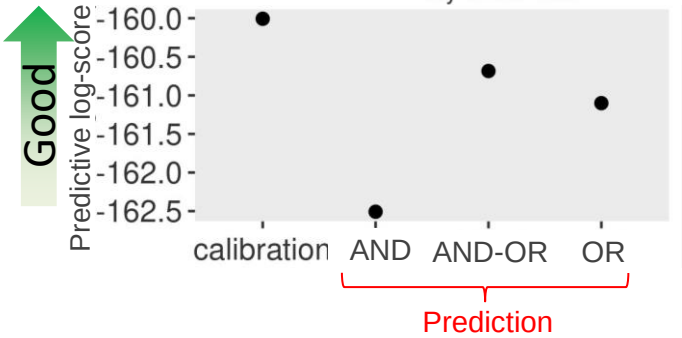
An intermediate AND-OR strategy may result in an better solution



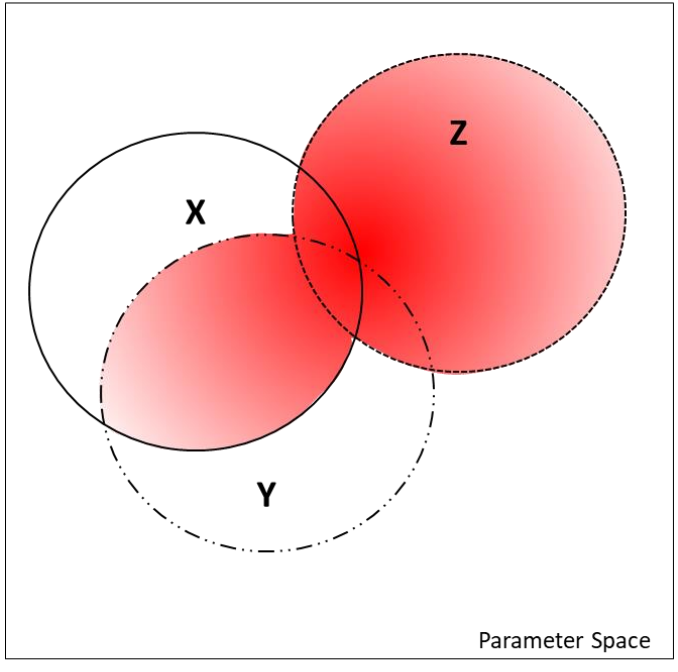




The AND-OR strategy results in more precise predictions than OR



'Alternative' AND-OR



$(P(X|\theta)$ AND $P(Y|\theta))$ OR $P(Z|\theta)$

Thank You

For more information:

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