Cattle grazing activities and methane production
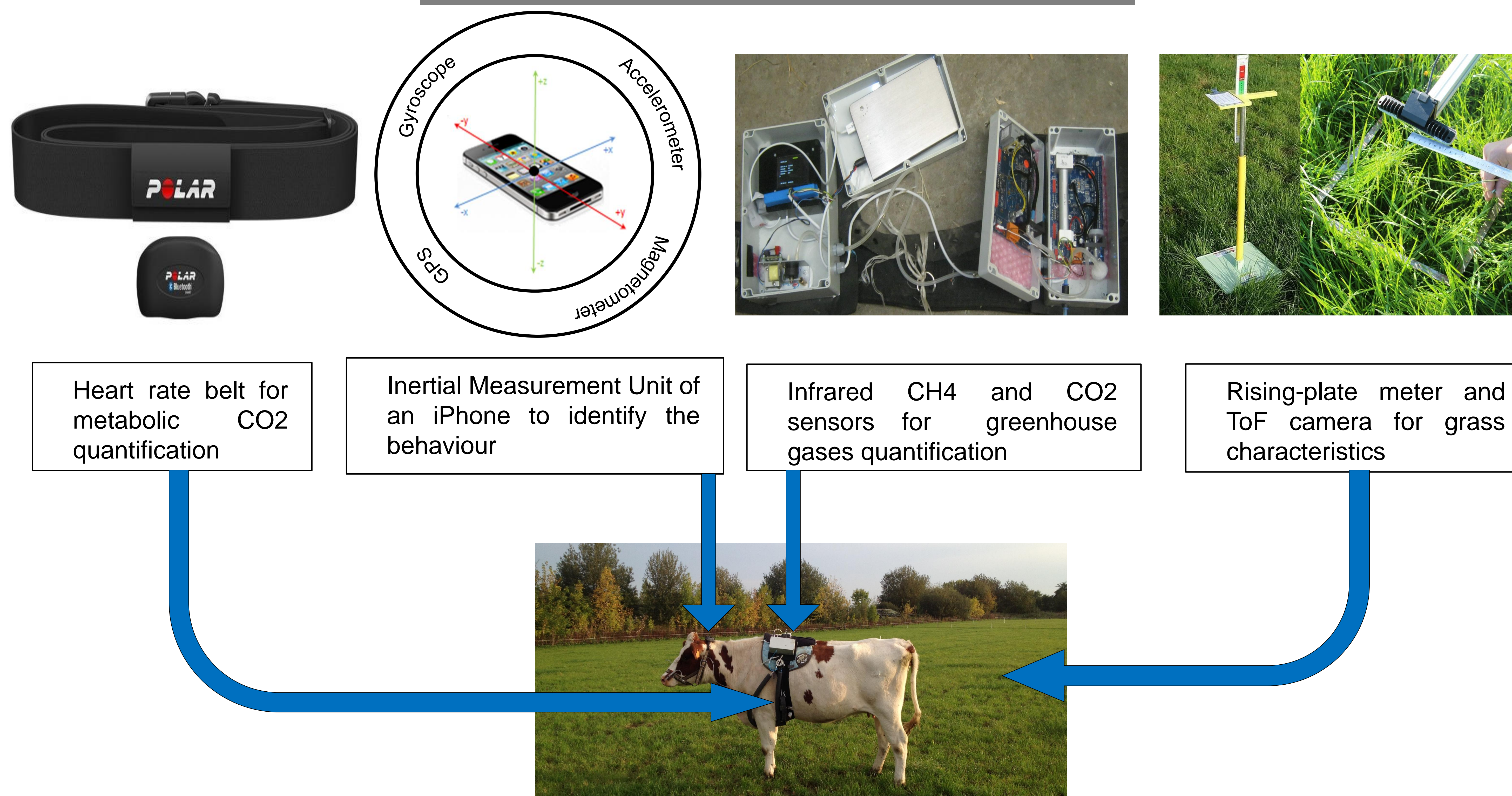
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Research questions

✓ How accurately is an iPhone's IMU able to detect cattle grazing behaviors
✓ Effect of pasture characteristics on grazing behavior?

✓ Are there diurnal CH4 dynamics production for grazing cows related to behavior and to pasture characteristics?
✓ How those methods could be helpful for farmers and authorities?

Sensors

Heart rate belt for metabolic CO2 quantification

Inertial Measurement Unit of an iPhone to identify the behaviour

Infrared CH4 and CO2 sensors for greenhouse gases quantification

Rising-plate meter and ToF camera for grass characteristics

FEEDING THE FUTURE

Data and Results

Behavior detection

Grazing

Ruminating

Others

Gx: gravitational acceleration on x-axis of the IMU, Behaviors: 1-grazing, 2-Ruminating, 3-Others, 0-missed observation

Detection accuracies (detection vs observation): 86% to 96%

Breathing and methane eructation detection

CH4:CO2 ratio

food intake
rumination
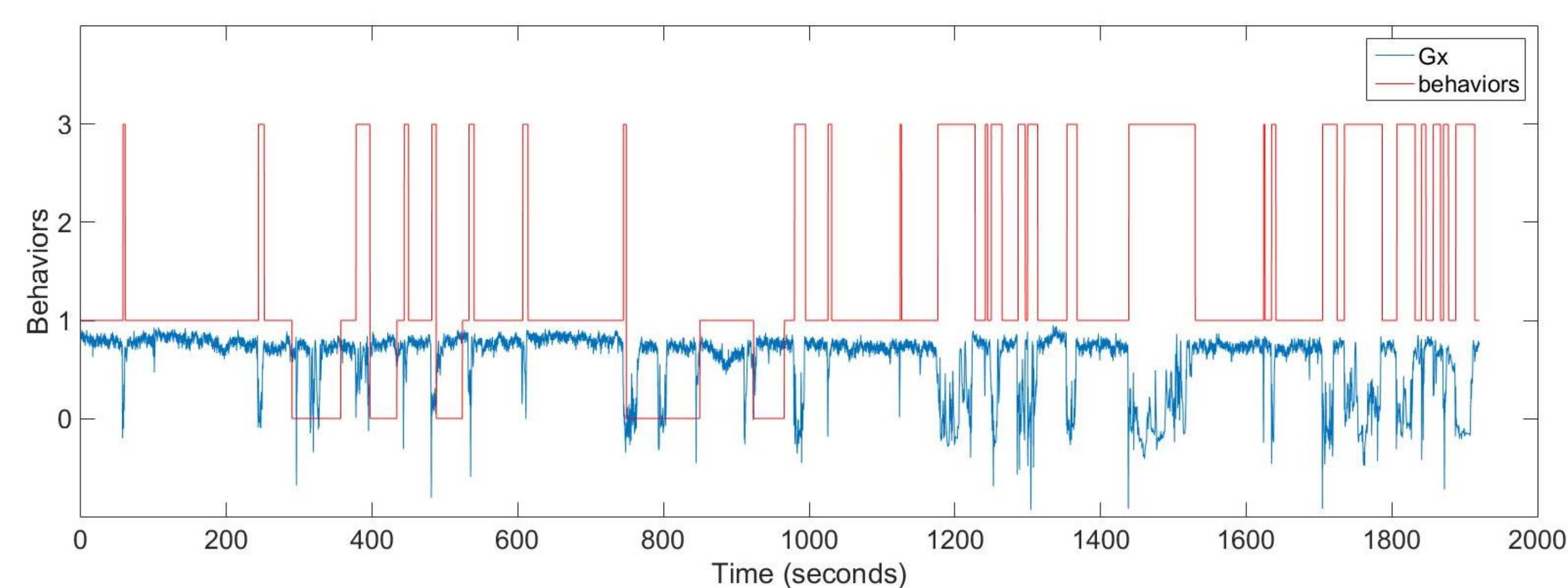rest
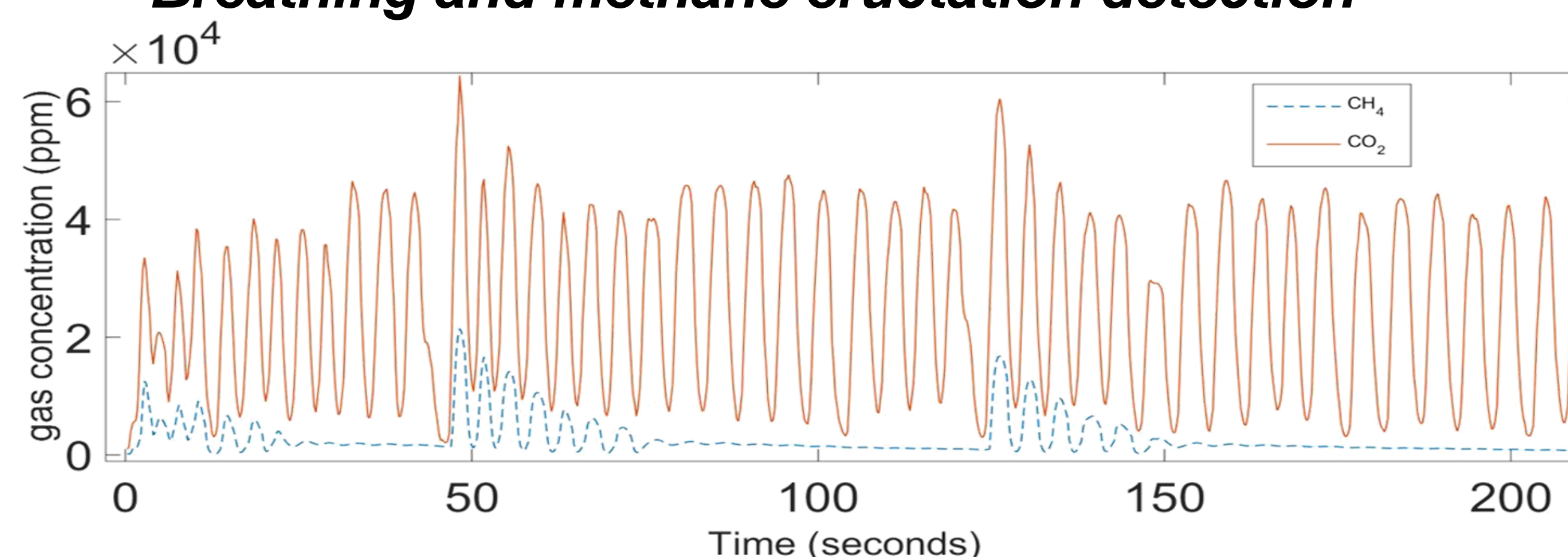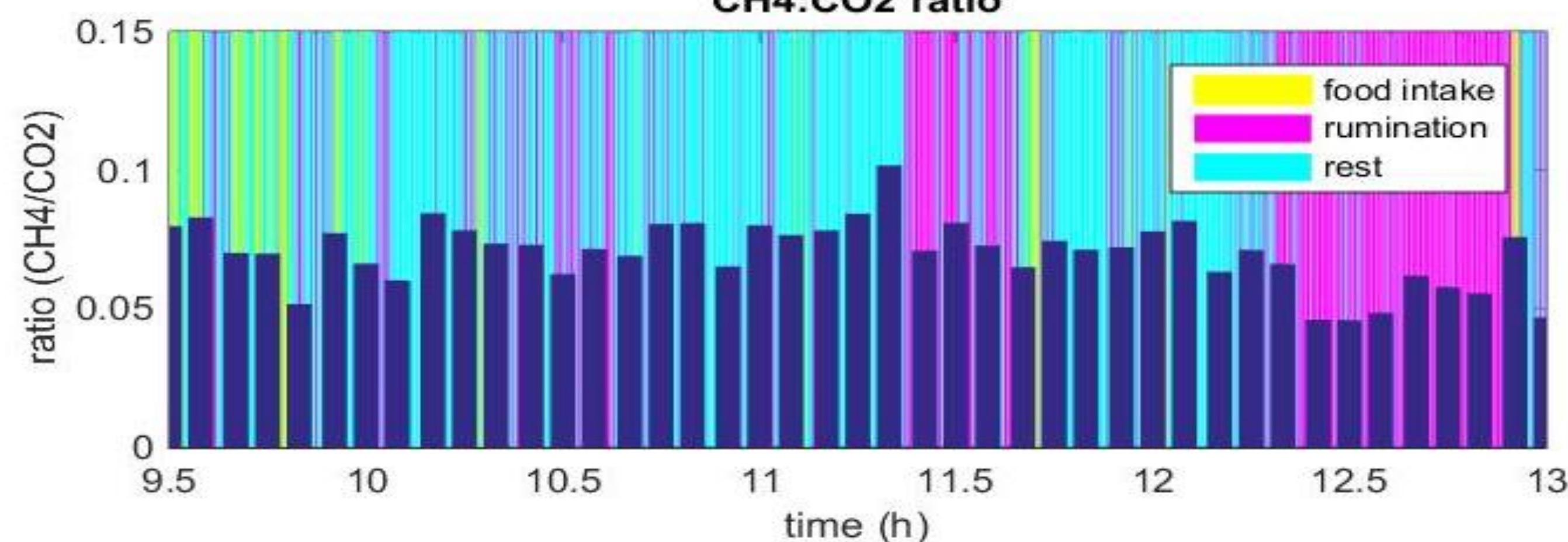
High frequency detection of breathing and eructation and link between methane production expressed by CH4:CO2 ratio and the behaviors

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