Welfare outcomes for livestock transported on Northern Isles ferry routes

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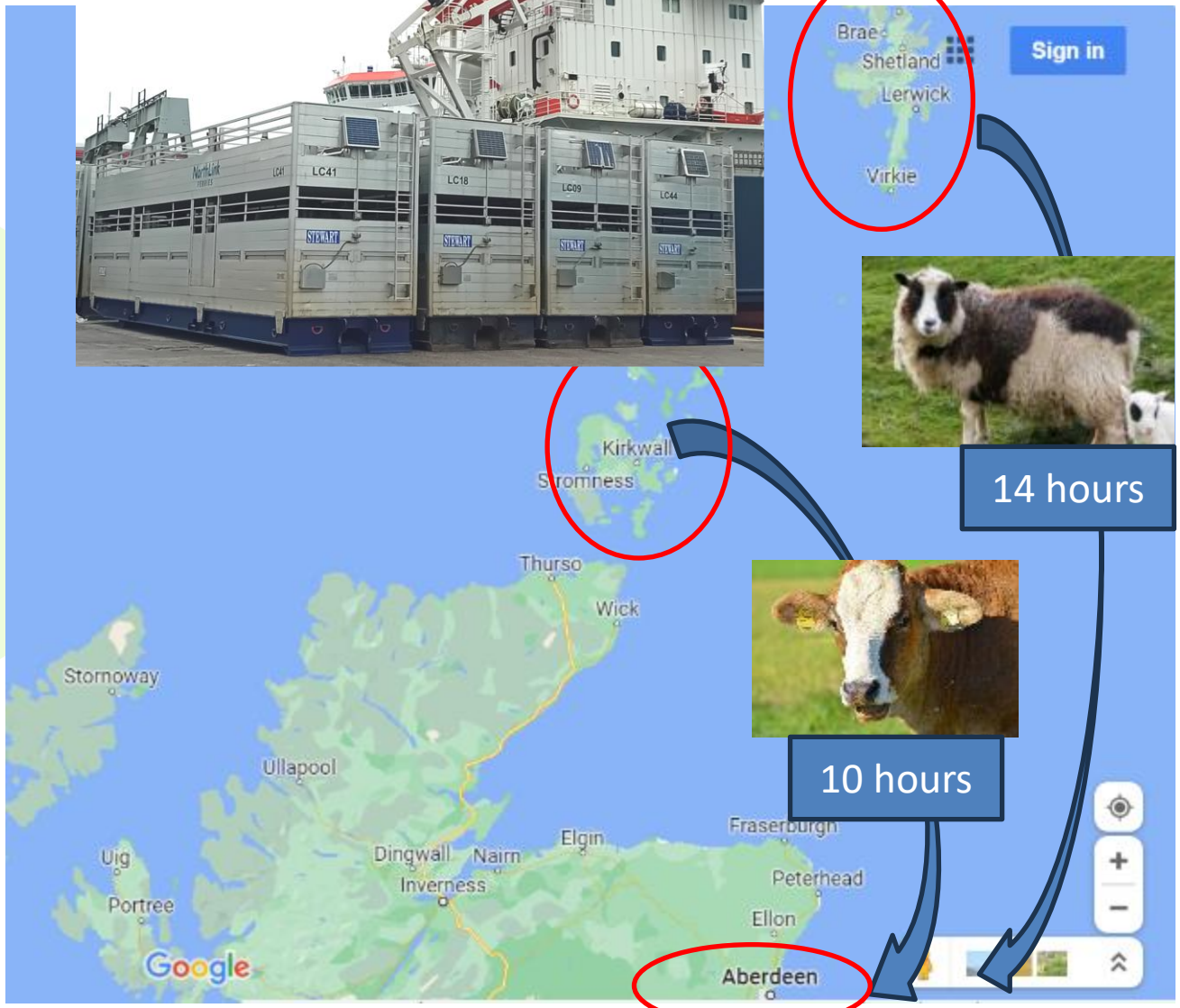
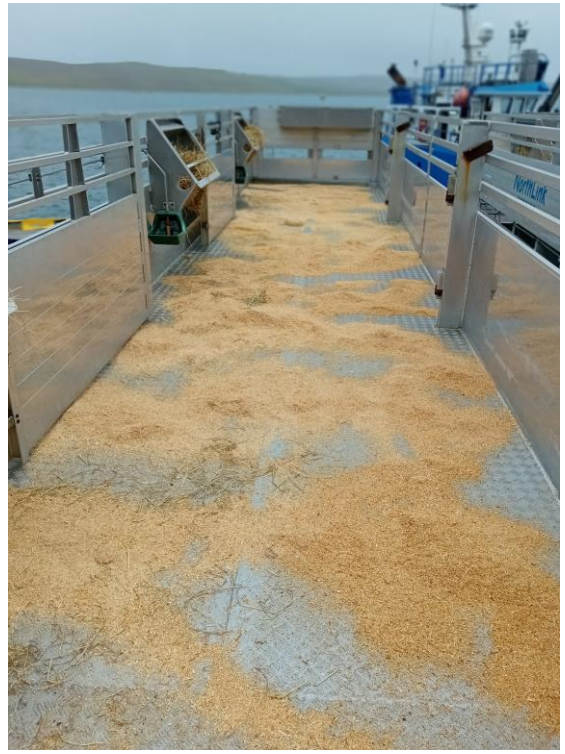
Leading the way in Agriculture and Rural Research, Education and Consulting

- 27,000 cattle; 152,000 sheep per year



- Transported in unique livestock cassette (LC) system
  - Food, water and slurry removal



- Exceeds the 8h duration for transport in standard vehicles
- Classed as ‘neutral’ time
- FAWC:
  - Is this justifiable?
  - Recommended looking at how animals respond

- Livestock production is of major socio-economic importance to the Northern Isles
  - E.g. 94% of agricultural land in Orkney is dedicated to livestock production

Why not kill the animals on the islands?

- Most animals sold to mainland in the autumn as stores
- Inadequate feed on islands to fatten animals
  - Welfare implications of them remaining over winter
- No abattoir in Orkney

Where do the animals end up?

- **Historical snap-shot**:
- Main destination for cattle was Aberdeenshire and Angus
- Sheep went to:
  - other Scottish locations = 64.1%
  - England = 33.1%
  - Wales = 2.7%

Focus and constraints

Focus:

- Main ferry journey to Aberdeen
  - Not initial journey to quayside in Lerwick and Kirkwall
  - Not onward travel
- Focus on cattle and sheep

Constraints

- Limited opportunities to visit animals on the freight decks at sea
- Data collection needs to be completed in a few months
  - Unable to sample all possible weather and sea states
  - Unable to sample all classes of animals in a wide range of conditions

Complexities of sea transport

- Motion of a vessel is complex with simultaneous movement in multiple planes
- Forces likely vary depending on location on the vessel
- Weather and sea states vary throughout a single journey, and route can be adapted real-time

- Species, and individual animals, may respond differently to the same physical experience

Scoping

- Interviews with 17 stakeholders
- Analysis of 7 years of local authority inspection reports in Aberdeen
  - 23/299,060 animals had a significant injury
- Subjective impression of fatigue and hunger reported by OVs

Response of animals during accompanied journeys

- Data were collected on 3 journeys from Orkney (store cattle) and 3 journeys from Shetland (lambs)
- 6 cassettes per journey

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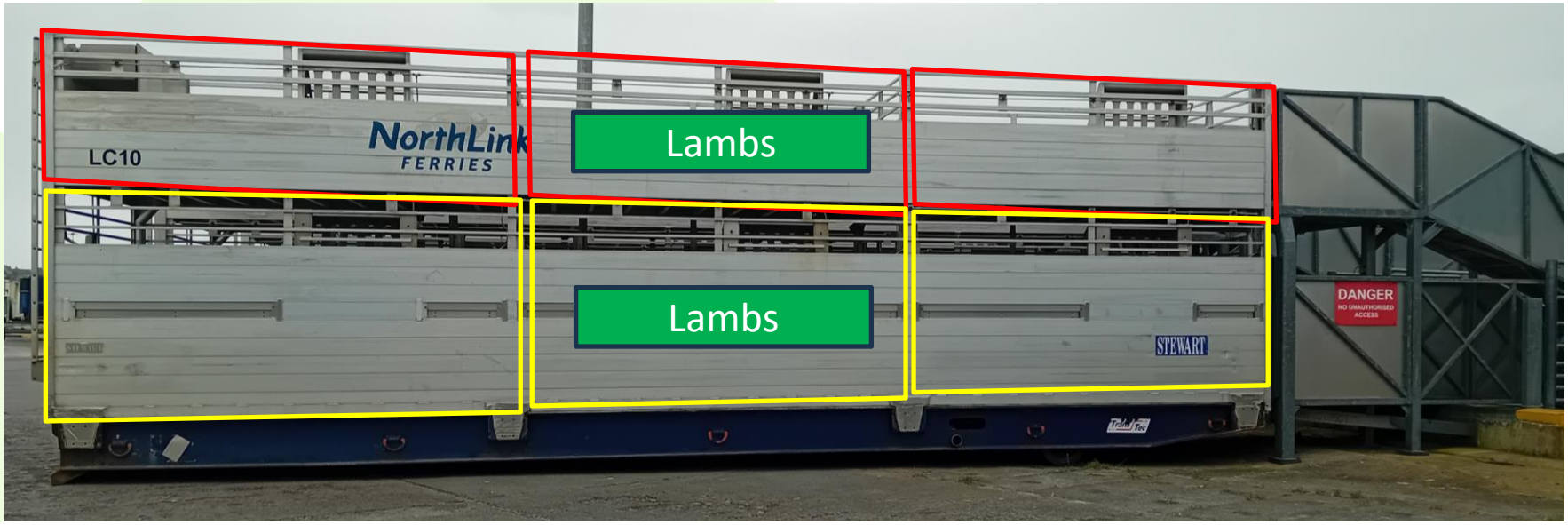

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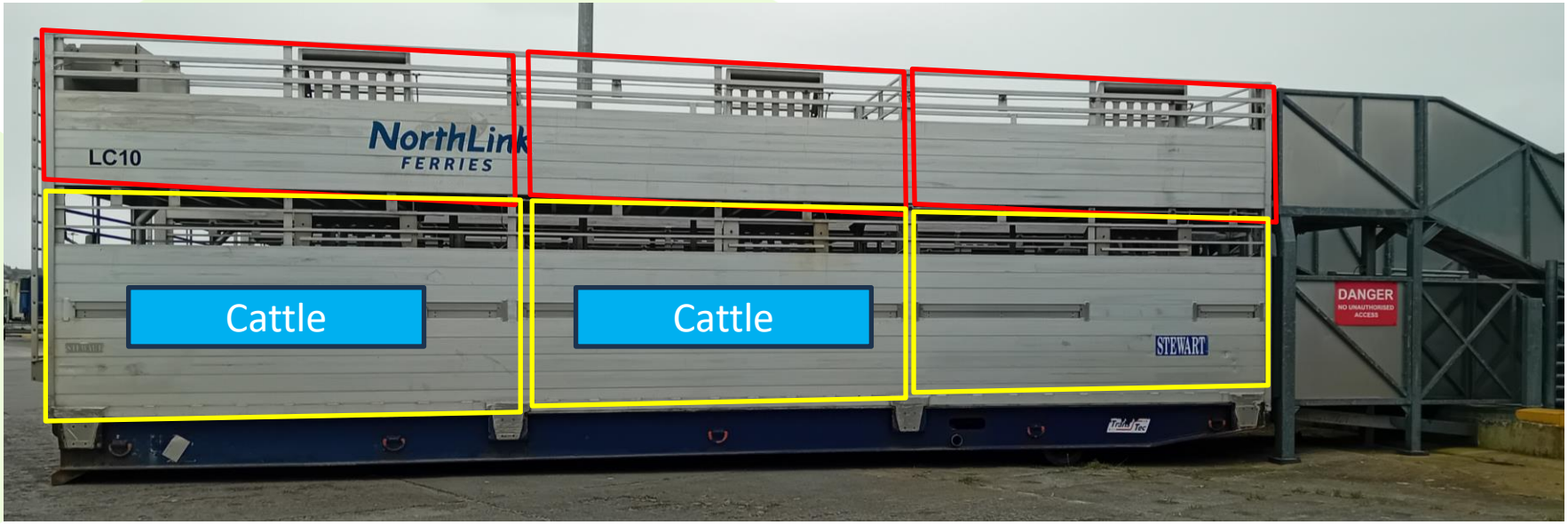
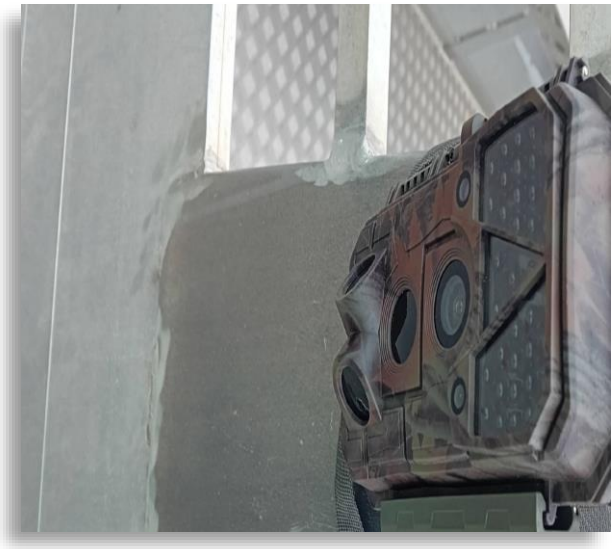
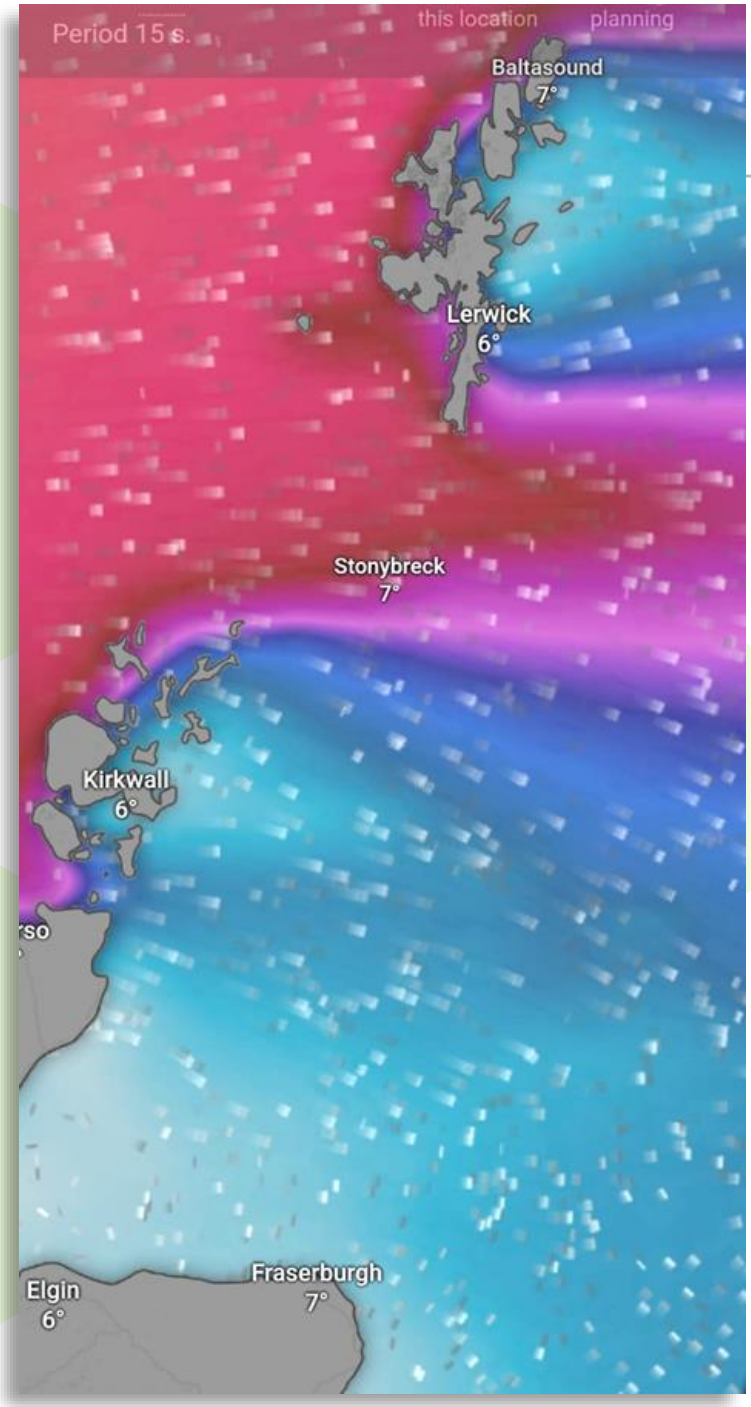


Data recorded



- Animal behaviour
  - 1 minute videos every 20 mins throughout sailing
- Temperature every 5 mins
  - inside cassettes
  - immediately outside cassettes
  - at edge of load-space
- Humidity every 5 mins
  - inside cassettes

- Sound every second
- Motion
  - acceleration (g) in two horizontal and the vertical plane 4 times/second
  - roll and pitch (10 times per second)



- Sea conditions recorded using a resource suggested by two vessel masters

Results – journey duration

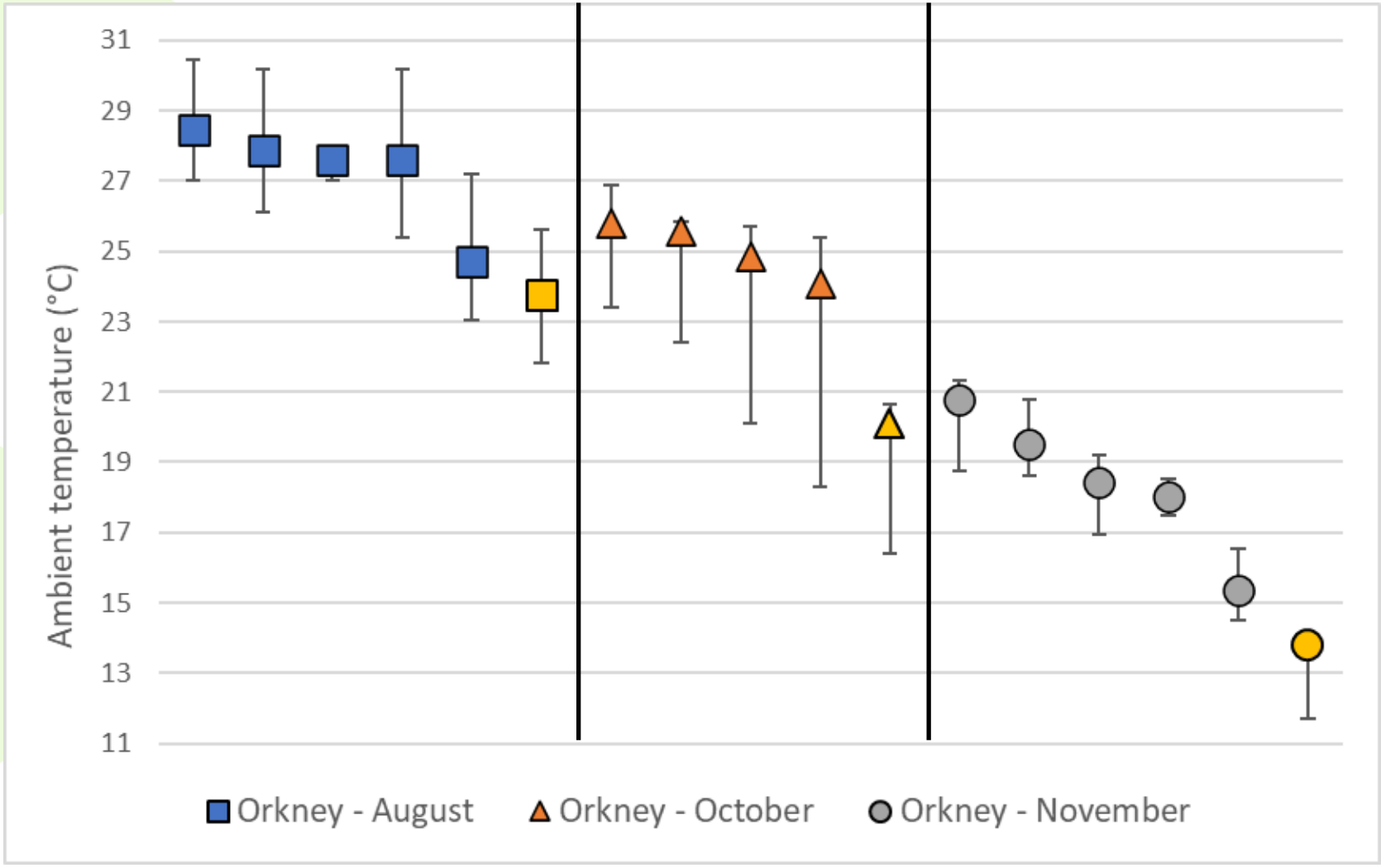
- Duration from entering cassette to vessel docking in Aberdeen:
  - Cattle – 14h 54min
  - Lambs – 19h 40min
- Duration from docking to unloading from cassette variable (10 min – 2h 30min)

Results – food availability

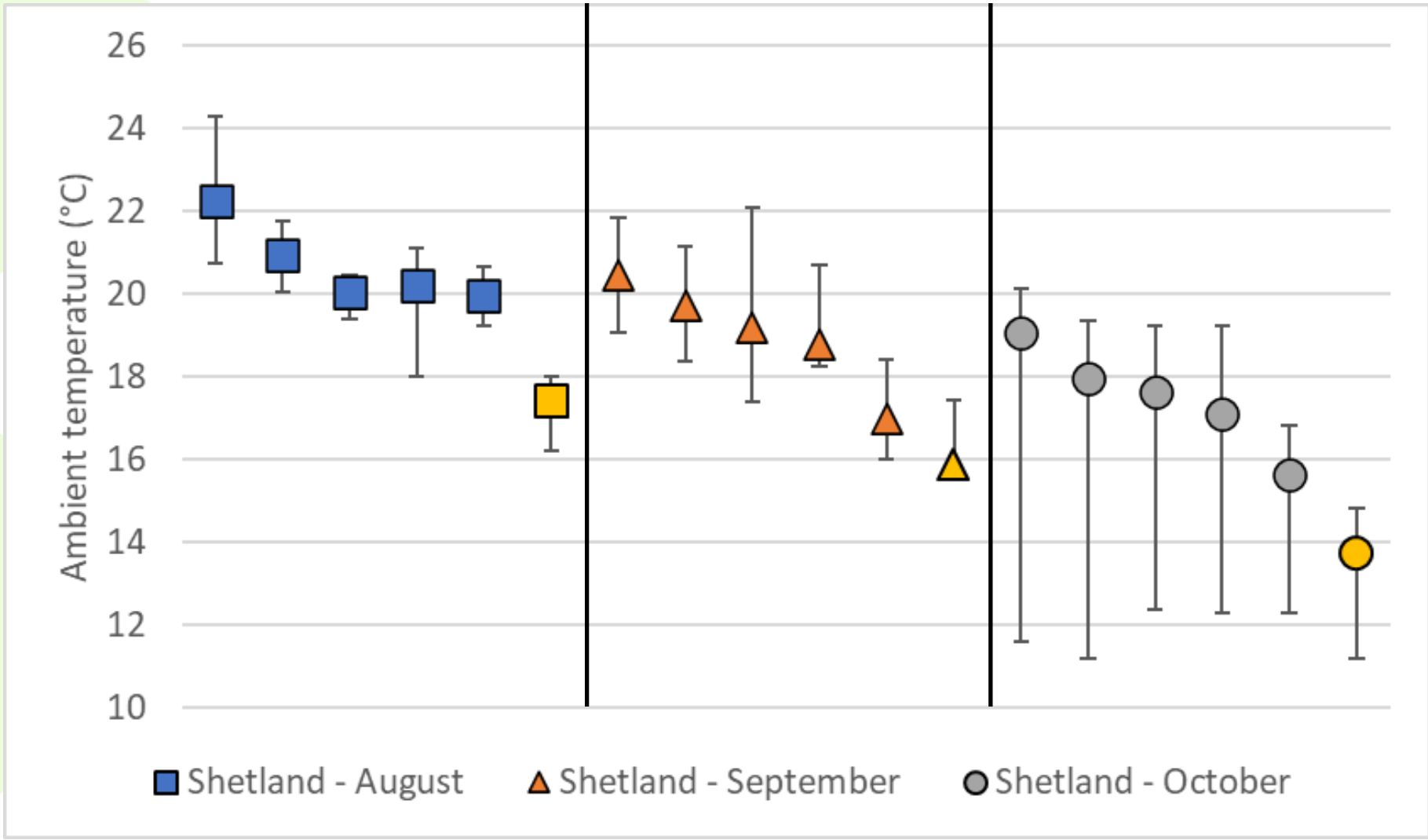
- Hay was provided from entry to the cassette
- **Cattle:** 25/35 compartments had hay remaining on docking.
  - In remaining 10 compartments, hay was consumed within 4h 33min (10h 21min before docking)
- **Lambs:** Hay consumed on within 3h and 4min after entry to cassette (16h 36min before docking in Aberdeen)

Results – temperature

- Average temperature in cattle cassettes during sailing clearly affected by season

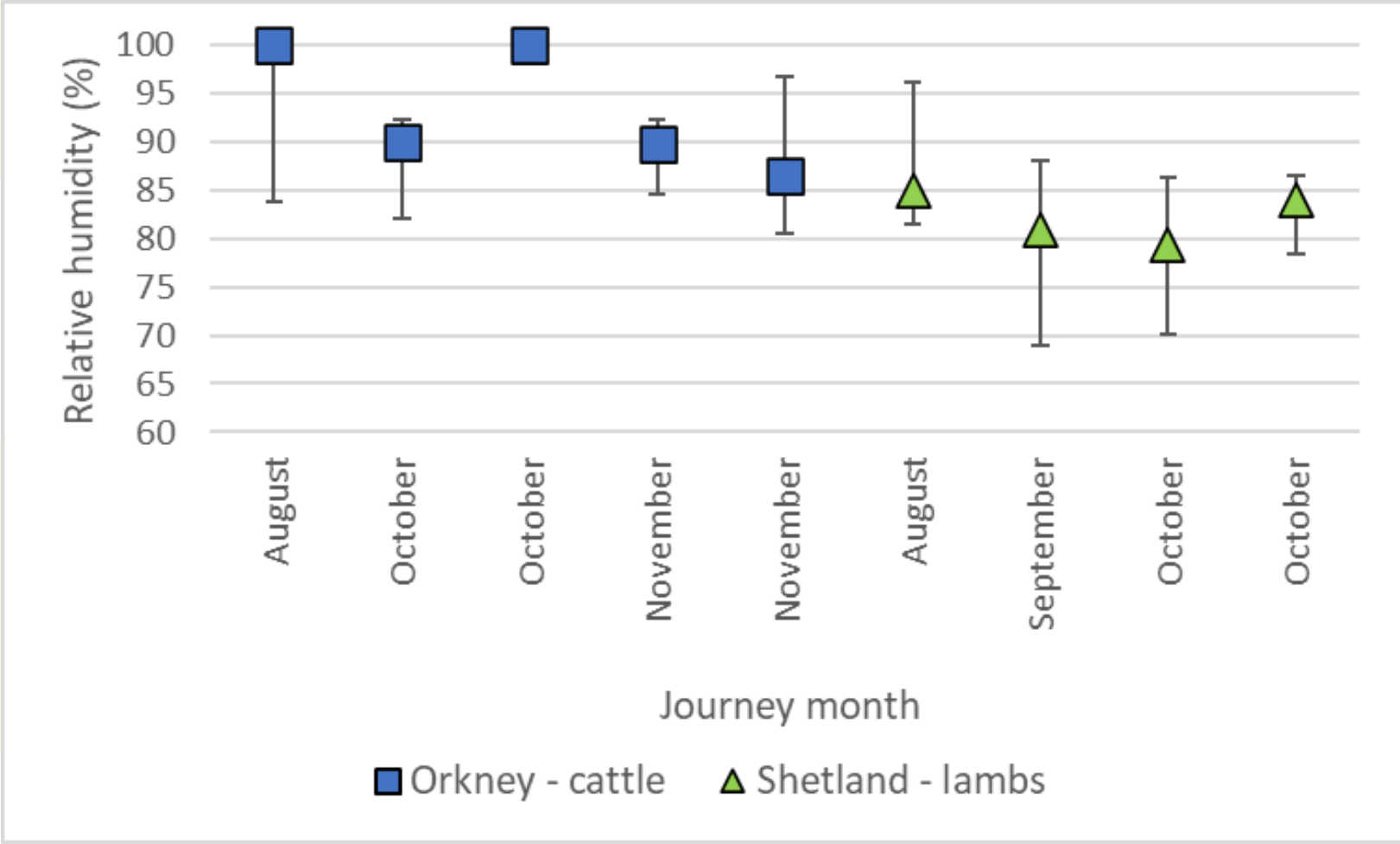


- Average temperature in lamb cassettes by journey:



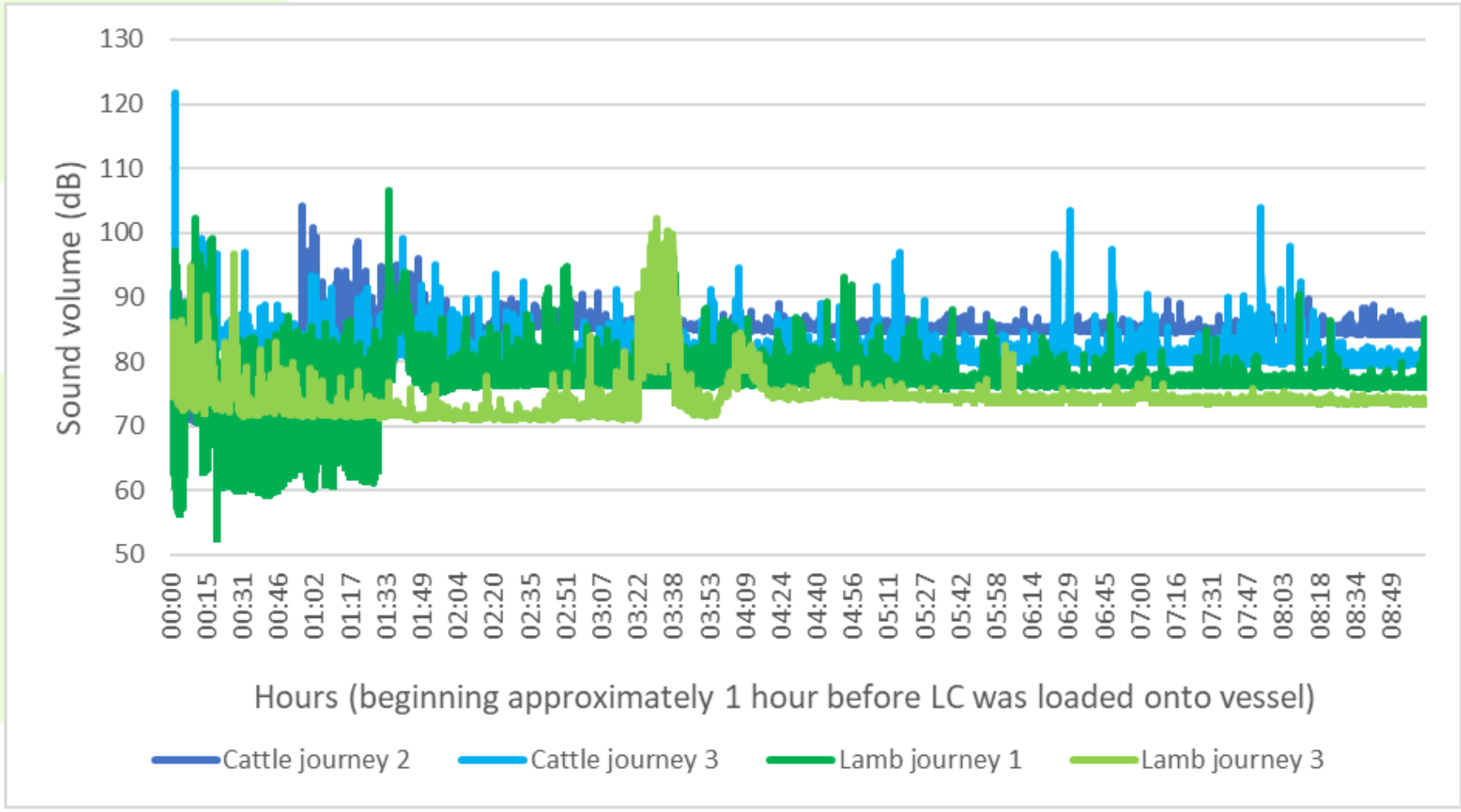
Results - humidity

- Average relative humidity greater than 85% in cattle cassettes



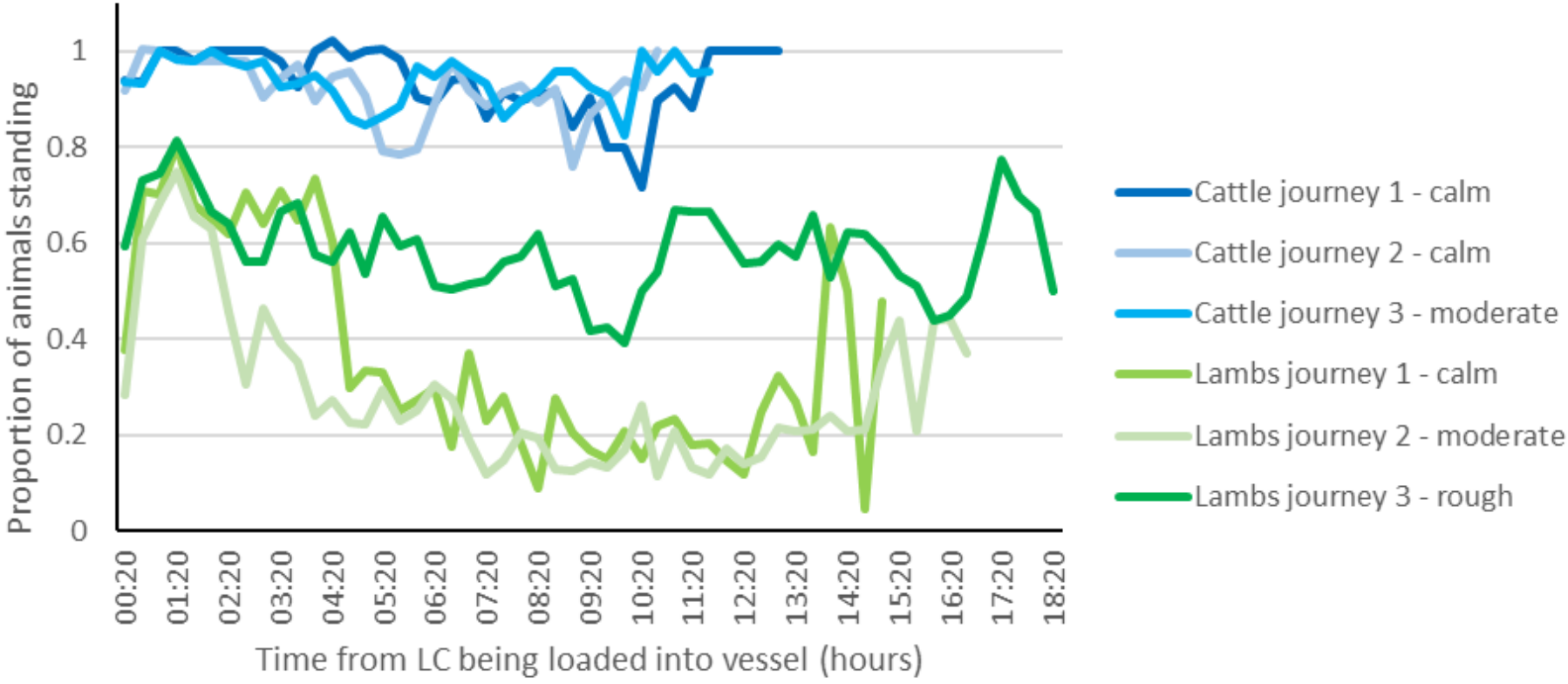
Results - sound

- Average sound levels were consistently around 80-90dB
  - (frequent exposure to 85dB+ requires hearing protection)



Results - behaviour

- Cattle were almost always standing
- Lambs lay down around two-thirds of the time
  - except when it was rough



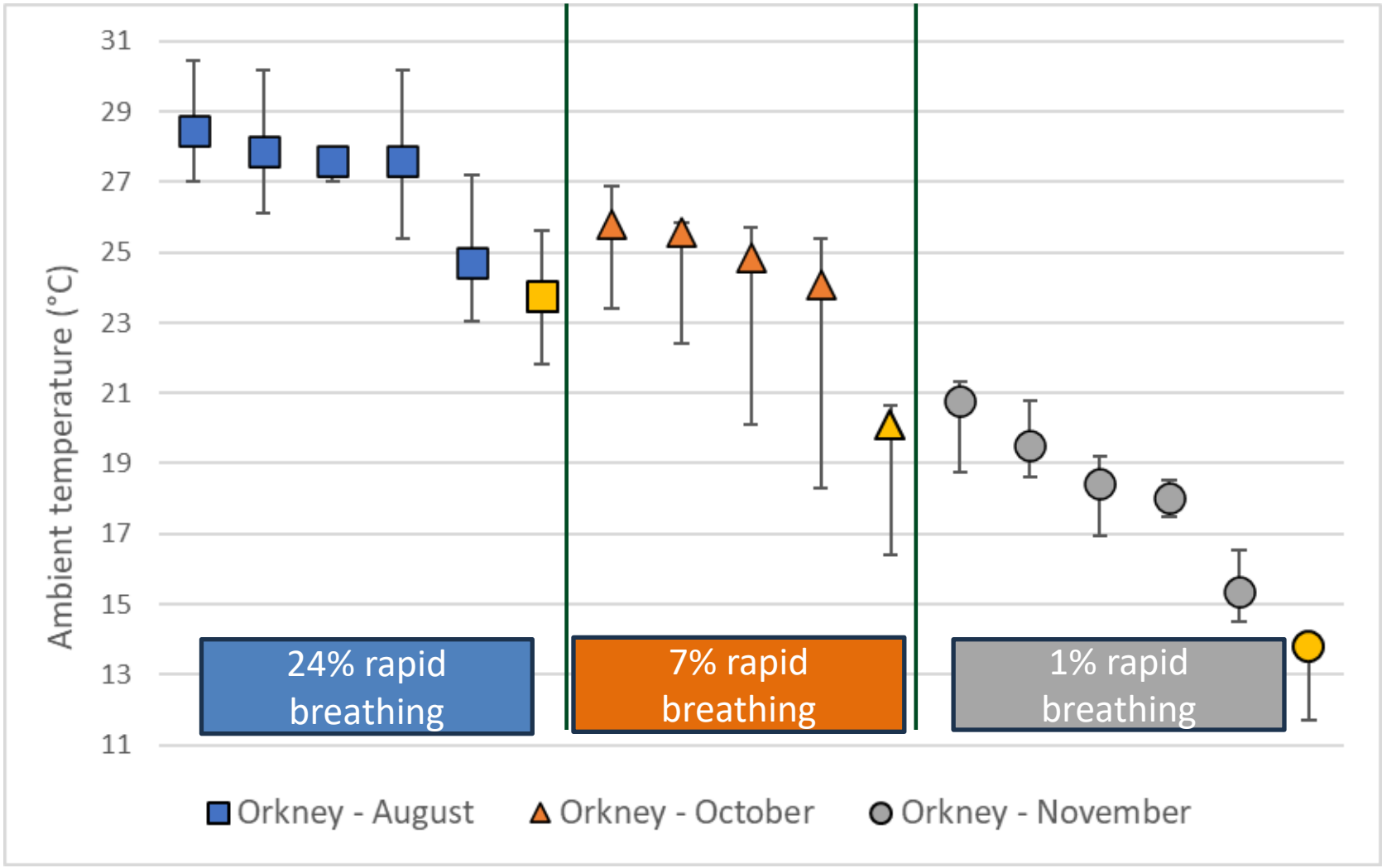
Results - Involuntary movements caused by ship motion

- Only one animal fell during a sailing (a lamb on a moderate crossing)
- Involuntary adjustment of position, contact with walls or contact with other animals absent on 3 journeys
- Present at very low levels on the 3 rougher journeys
  - Cattle approximately 0.13 movements/animal/hour
  - Lambs approximately 0.04 movements/animal/hour

- No obvious injuries present in Aberdeen that could be confidently attributed to the journey
  - Calm handling at all three lairages by experienced staff

Results – rapid breathing

- Rapid breathing varied from 2-5% of lambs
- Rapid breathing by cattle more common on warmer journeys:



Results – other behaviours

- Ruminating was rare (6-7% of animals per observation)
- Drinking was rare in lambs
- Drinking not seen in cattle

Behaviour in Aberdeen lairage

- Behaviour was noted every 5 minutes, beginning 5 mins after animals left cassette
- Most animals moved onto trucks within 30 mins
- Drinkers were in use in most pens at the first 5 minute observation point

- For cattle it took over an hour for the first animal to lie down
- Rumination was rare
  - 2-8% of animals

Conclusions and recommendations

- The system works very efficiently
  - Difficult to see how the process could be quicker
- Handling was calm
- Likely to be rare that long-term welfare is affected by the journey

- Some indicators suggest that stress is experienced during the journey:
  - Lack of lying
  - Rapid breathing
  - Lack of rumination
  - Period without food

Considerations for further refinement

- Hay racks could hold more hay than currently offered
- Access to/attractiveness of water in port lairages could be improved
- Quantification of water use in cassettes would be a useful follow-up study
- On-going monitoring of temperature within cassettes
- Effort to reduce heat load in cattle cassettes on warn days
- Welfare of other classes of stock should be assessed

Acknowledgements

- Thanks to:
  - The lairage, stevedore and vessel staff for their help and flexibility
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