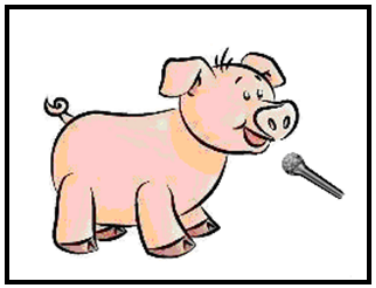

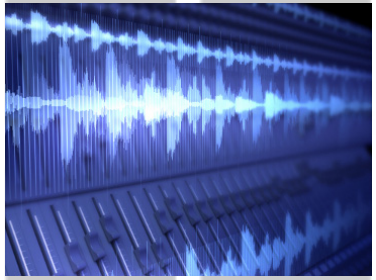

SoundTalks

Pig cough monitoring in the EU-PLF project: first results

August 25th, 2014. EAAP 2014 Copenhagen Denmark

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Agenda

1. Introduction
   - Precision Livestock Farming
2. Materials and Methods
   - Pig Cough Monitor
   - EU-PLF
3. Results and Discussion
   - 3 cases
4. Conclusions

Precision Livestock Farming

- Stress factors traditional livestock farming
  - Global increase meat demand (population, net income increase)
  - Ethical & environmentally friendly (e.g. antibiotics reduction)
  - Economic incentives: economies of scale
- Hanton & Leach, 1981
  - Livestock farming as process control technology
- Berckmans, 2006: Precision Livestock Farming (PLF)
  - Farmer decision support
  - Animal at the center
  - Conditions:
    - continuous monitoring
    - prediction animal variables reliable wrt environmental changes
    - real-time integration measurements / algorithms

Pig Cough Monitor (PCM)

Embedded board in sealed enclosure

Cabling (mic / power)

Condenser microphone

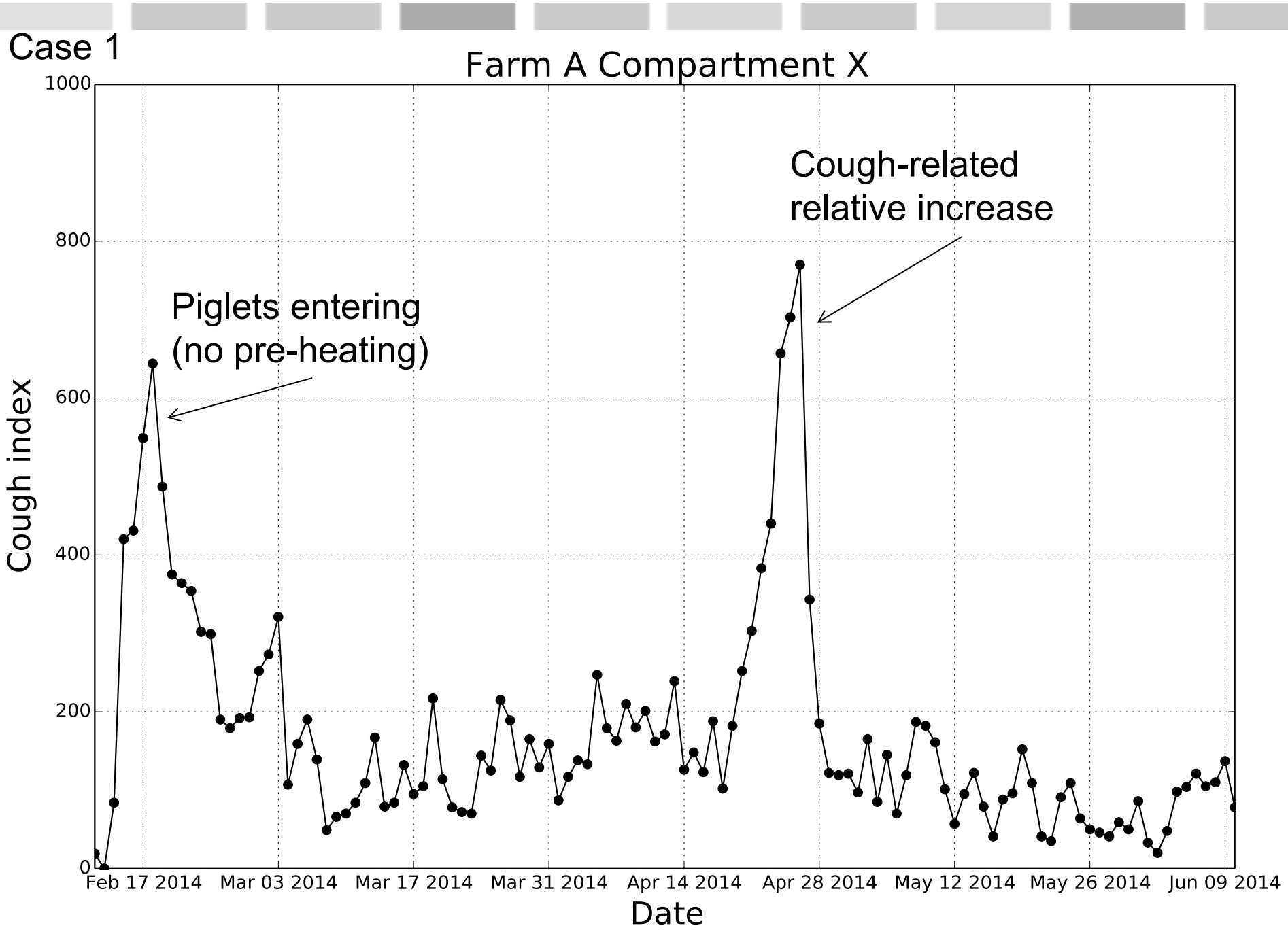
- PLF: acoustic monitoring of fattening pigs
- Hardware
  - Continuous recording
  - Robust to farm environment
- Cough detection
  - Sound acquisition
  - Event selection, feature extraction
  - Classification

EU-PLF

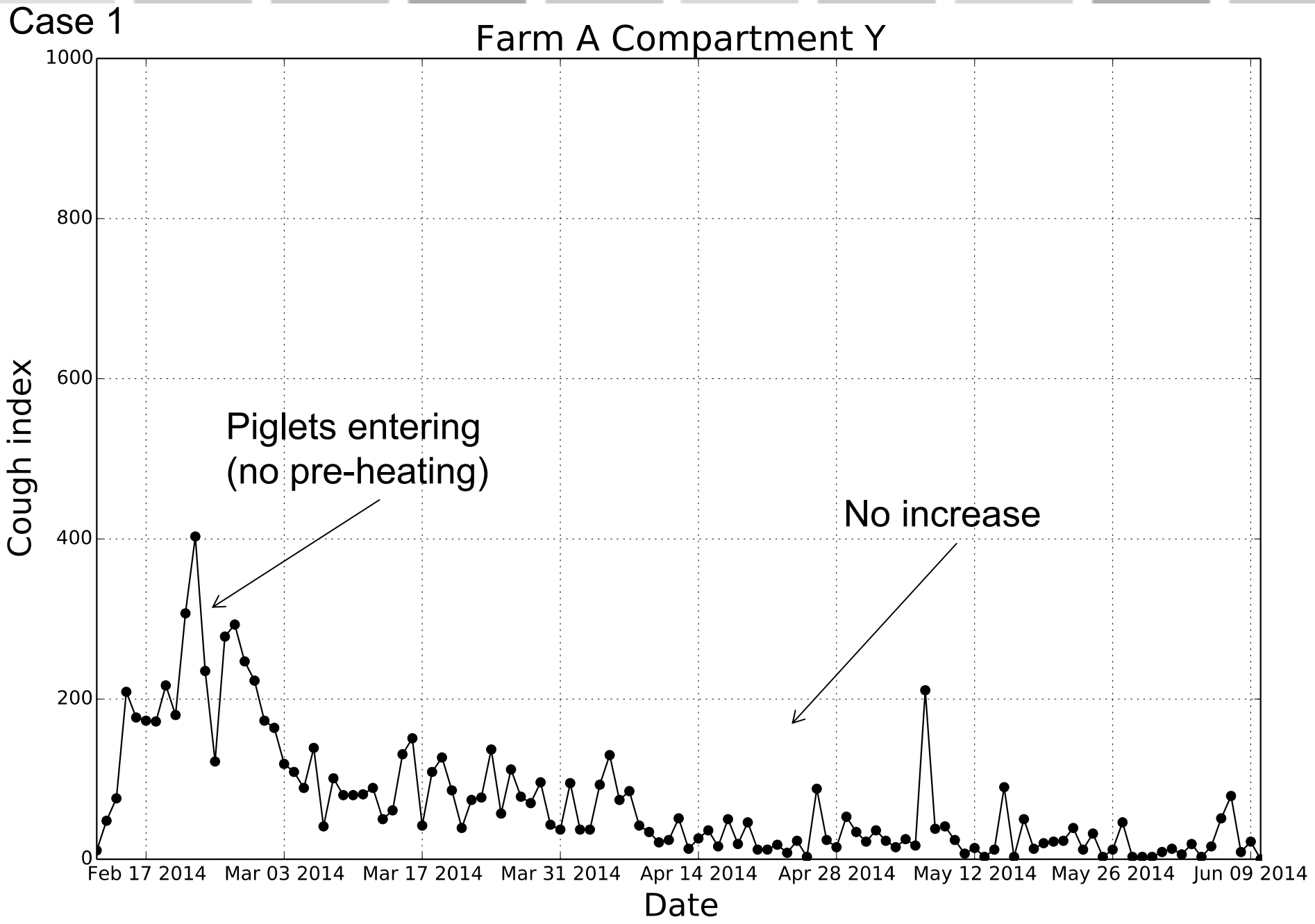
- Aim: economic application PLF-technology
- Data collection
  - 60 pig fattening rounds
  - 10 farms over Europe
  - Quantitative: microphone (PCM), camera, …
  - Qualitative: batch metadata, welfare assessments, …
- Data combination
  - Here: first results

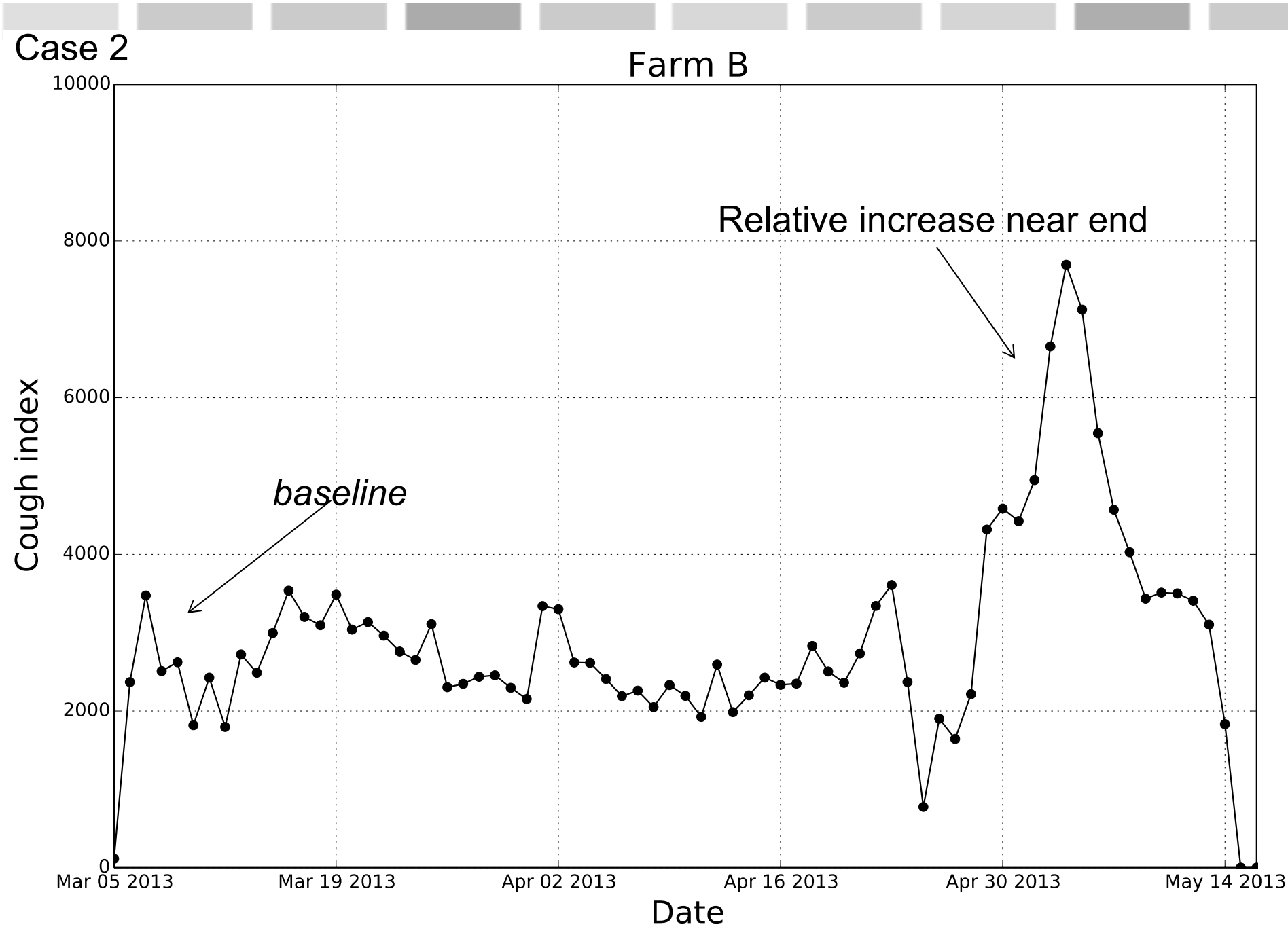
Cases

- 3 cases
  1. Comparison batch X, Y farm A
  2. Batch farm B
  3. Batch farm C
- PCM-data over duration of single batch
- Selection based on logbook info
- Cough index: number of cough groups / day
  - Cough group: cough < 5s apart (episodes)
  - Per day (daily occurring patterns)
  - Relative levels (number of animals unknown)

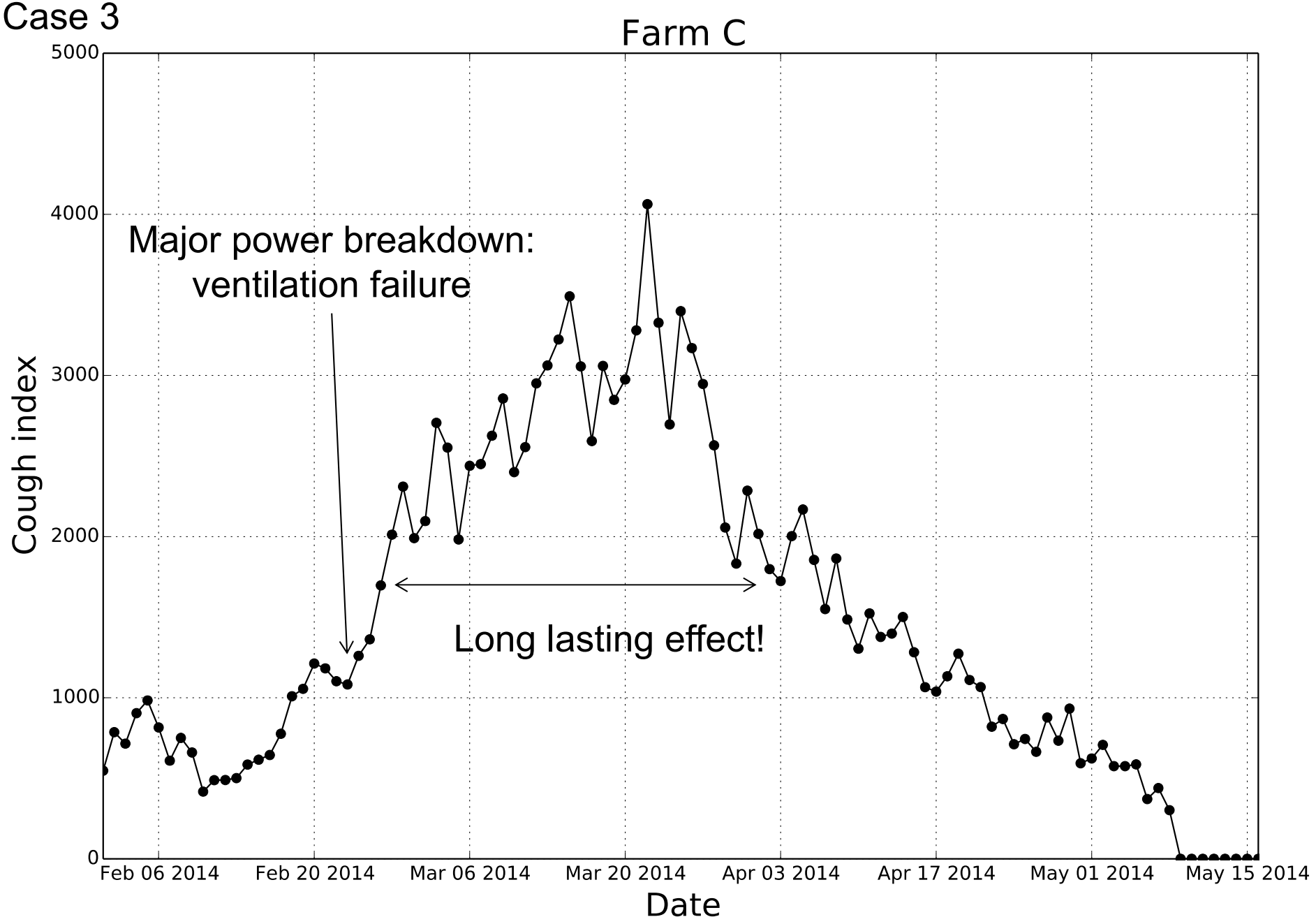

Case 1
Farm A Compartment X
Cough-related
relative increase
Piglets entering
(no pre-heating)
Cough index
1000
800
600
400
200
0
Feb 17 2014
Mar 03 2014
Mar 17 2014
Mar 31 2014
Apr 14 2014
Apr 28 2014
May 12 2014
May 26 2014
Jun 09 2014
Date

Case 1


Farm A Compartment Y
Cough index
1000
800
600
400
200
0
Piglets entering
(no pre-heating)
No increase
Feb 17 2014
Mar 03 2014
Mar 17 2014
Mar 31 2014
Apr 14 2014
Apr 28 2014
May 12 2014
May 26 2014
Jun 09 2014
Date


Case 2
Farm B
Relative increase near end
baseline
Cough index
10000
8000
6000
4000
2000
0
Mar 05 2013
Mar 19 2013
Apr 02 2013
Apr 16 2013
Apr 30 2013
May 14 2013
Date

Case 3


Farm C
Major power breakdown:
ventilation failure
Long lasting effect!
Cough index
Date
0
1000
2000
3000
4000
5000
Feb 06 2014
Feb 20 2014
Mar 06 2014
Mar 20 2014
Apr 03 2014
Apr 17 2014
May 01 2014
May 15 2014

Conclusions

- PCM allows PLF in real economic setting
- Here: first results of pig cough detection on 3 selected EU-PLF farms
- Effectiveness in practical setting
- Real added value: identification of issues
- Early warning system potential
- Further scientific and economic analyses required
  - Additional batch metadata
  - Different PLF-sensor inputs

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Disclaimer

Thank you for your attention

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