# Weather Station Comparative

## Comparative Evaluation of Weather Stations at Olds College

**RESEARCH QUESTION:** **Evaluation of multiple weather station platforms — including equipment design, cost, usability and disease model functions — in use on the Olds College Smart Farm.**

## Method

- 7 weather stations were installed for evaluation
- Evaluations of each weather station (equipment costs, platform user interface, data reliability, etc.)
- Disease risk utility offered by Weather INnovations, FarmerCommand, Alberta Climate Information Service (ACIS) and FieldClimate were assessed for functionality and verification of disease risk.

### Field 13/14:

- Arable Mark 2 (Arable)
- EOS1000 AD (EOS)
- Pessl/iMETOS IMT 3.3 (FieldClimate)
- RealmFive Vantage Pro 2 (RealmFive View)

### Steckler:

- Weather INnovations ADCON (DecisionFarm)
- Farmers Edge (FarmCommand)
- Pessl/iMETOS ECO D3 (FieldClimate)

### Offsite:

- Alberta Climate Information Service (ACIS) Station

## Results

**Table 1. Overall Installation Rating**

1 - Very Difficult
2 - Difficult
3 - Neutral
4 - Easy
5 - Very Easy

| | Arable Mark 2 | Pessl/iMETOS IMT 3.3 | RealmFive Vantage Pro 2 | EOS1000 AD | Weather INnovations ADCON | Pessl/iMETOS ECO D3 | Farmers Edge |
|---|---|---|---|---|---|---|---|
| Hardware installation & field set up | 5 | 3.5 | 4 | 4 | 2.5 | 3.5 | 5 |

**Table 2. Overall Platform Rating**

1 - Very Difficult/Very Poor/Limited
2 - Difficult/Poor
3 - Neutral/Moderate
4 - Easy/Satisfactory
5 - Very Easy/Very Satisfactory/Abundant

| | Arable | FieldClimate | RealmFive View | EOS | Weather INnovations | FarmCommand |
|---|---|---|---|---|---|---|
| Ability to navigate the platform | 4.5 | 3.5 | 4.75 | 5 | 3.75 | 3.75 |
| Transparency of information | 4.5 | 3.5 | 4.5 | 5 | 4 | 3.75 |
| Rating amount of additional utilities & tools provided | 3 | 3 | 3 | 1 | 5 | 3 |
| Overall platform rating | 4 | 2.75 | 3.75 | 4 | 2.75 | 3.5 |
| Mobile application available | YES | YES | NO | NO | NO | YES |

**Table 3.** Summary table of missing measurements throughout the experimental time. Service interruption is calculated as the percentage of data rows which are missing (when data was not properly collected in at least 1 sensor, in at least 1 variable), and missing measurements is the percentage of individual measurements missing from the entire dataset.

| Sensor/ Cluster | Service Interruption | Missing Measurements | Dates/Times Affected |
|---|---|---|---|
| Arable Mark 2 – Daily Field 13/14 | 0.66% (1 row) | 0.11% (5 data points) | 2021-10-29 |
| Arable Mark 2 – Hourly Field 13/14 | 0.92% (13 rows) | 0.78% (286 data points) | 2021-07-29<br>Hourly between 11:00 - 23:00 |
| Pessl/iMETOS IMT 3.3 Field 13/14 | 0% | 0% | N/A |
| Pessl/iMETOS ECO D3 Steckler | 0.06% (2 rows) | 0.05% (112 data points) | 2021-06-04 00:00:00<br>2021-06-08 15:00:00 |
| EOS1000 AD Field 13/14 | 0% | 0% | N/A |
| Farmers Edge Steckler | 0% | 0% | N/A |
| Weather INnovations ADCON Steckler | 0% | 0% | N/A |
| RealmFive Vantage Pro 2 Field 13/14 | 0.03%<br>(3 rows) | 0.01% (10 data points) | 2021-06-16<br>2021-06-28<br>2021-07-03 |

## Producer Value:

- Improved weather station selection for on-farm needs.
- Unbiased evaluation of weather platforms.

## Future Research/ Next Steps:

- Compare specific weather measurements (ie. wind) between stations to measure variability in readings.
- Measure accuracy of multiple platform predictive models though ground-truthed measurements.
- Identify if soil temperature and moisture readings can be used for seeding date and depth predictions.
- Compare platform spray models to identify the variability of measurements or parameters incorporated into the spray drift risk.
- Identify weather alerts available on each platform and the effectiveness of the alert delivery method.