TURNING INFORMATION INTO PROFITS.

Smart Agriculture in Practice
Pessl Instruments Over Time

- Argentina 1990
- USA 1995
- Germany 2005
- New Factory 1995
- Company Expansion 2015
Experienced, Global, Successful!

HEADQUARTERS:
Weiz, Austria

> 45,000 stations up & running
> 220,000 sensors connected
> 85 countries installed
> 105 people employed

AFFILIATES & DISTRIBUTORS
METOS® ANZ
METOS® BRASIL
METOS® FRANCE
METOS® IBERIA
METOS® ITALY
METOS® LATAM
METOS® MOLDOVA
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METOS® POLSKA
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METOS® SOUTH-EAST ASIA
METOS® TURKEY
METOS® UKRAINE
METOS® USA

REPRESENTATION DEALERS & AFTER-SALES SERVICE POINTS:
All EU Countries
Ex-Yugoslavia
Egypt
Iran
India
Israel
Argentina
Iran
Vietnam
Philippines
Peru
Colombia
Bolivia
Indonesia
Niger
Kenia
Russia

Branch offices
Countries covered by distributors
Holistic solutions for smart agriculture

Pessl Instruments
DSS Solutions

- In field Monitoring (Weather)
- Weather Forecast Modelling
- Disease Forecast Modelling
- Crop Monitor
- Insect Monitor
- Soil Moisture Monitor
- Soil Analyses
- Fertility Monitor
- Storage / Tank Monitoring
- GPS Work Tracking on machines

Active Alert/Automation

- Accident Warning System
- Frost warning systems
- Automation in Irrigation
FieldClimate

We are experts in Climate monitoring for more than 30 years.

Hyper Localised Climate Monitoring

40 years of Weather data history licence available for any place.
## CLIMATE CHANGE MANAGEMENT – LATE FROST PROTECTION

<table>
<thead>
<tr>
<th>Critical temperature ($T_r$) values ($^\circ$C) for grapevines</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grape</strong> (1)</td>
<td>New growth:</td>
<td>?</td>
</tr>
<tr>
<td>Woody vine:</td>
<td>-20.6</td>
<td>-20.6</td>
</tr>
<tr>
<td>French hybrids</td>
<td>-22.2</td>
<td>-23.3</td>
</tr>
<tr>
<td><strong>American</strong></td>
<td>-27.8</td>
<td></td>
</tr>
<tr>
<td>10% kill</td>
<td>90% kill</td>
<td></td>
</tr>
<tr>
<td><strong>Grapes (cv. Concord)</strong> (2)</td>
<td>First swell</td>
<td>-10.6</td>
</tr>
<tr>
<td>Late swell</td>
<td>-6.1</td>
<td>-12.2</td>
</tr>
<tr>
<td>Bud burst</td>
<td>-3.9</td>
<td>-8.9</td>
</tr>
<tr>
<td>First leaf</td>
<td>-2.8</td>
<td>-6.1</td>
</tr>
<tr>
<td>Second leaf</td>
<td>-2.2</td>
<td>-5.6</td>
</tr>
<tr>
<td>Third leaf</td>
<td>-2.2</td>
<td>-3.3</td>
</tr>
<tr>
<td>Fourth leaf</td>
<td>-2.2</td>
<td>-2.8</td>
</tr>
</tbody>
</table>
CROP HEALTH MANAGEMENT – DISEASE RISK MANAGEMENT
WHEN TO APPLY FERTILIZER:

- Optimal is when after spreading follows 40 mm of rain, also 25 mm is good
- Bad is when no rain follows – we can help with irrigation system
- With no rain fertilizer is not being diluted and the uptake to the plant isn't possible

WHEN TO SPRAY:

- If after a spray a rain follows (from 5 mm on), we can lose all the active compound to the ground
- Spraying should not be done if wind speed is more than 10 m/sec
- If after a spray there is a period of high RH – more than 70 %, it takes longer to dry out the applied spray – uptake to the plant is better
WATER MANAGEMENT– IRRIGATION/INPUT MONITORING

The weather station with temperature, humidity, rainfall, global radiation and wind speed is used to calculate the potential evapotranspiration (ET₀).

Profile probe soil moisture sensor (from Sentek or John Deere) with sensors at every 10 cm measuring volumetric soil moisture, electrical conductivity and temperature can:

- Increase water use efficiency
- Improve fruit quality
- Improve yield
OPTIMAL WATER BALANCE

Soil - plant - atmosphere monitoring
Data interpretation
ACTION
When and how much to irrigate
Automation

Tuesday
23.02.2016

Temperature (°C)
Wind (km/h)
Precipitation probability
Precipitation (mm)

00000146 47.21°N / 15.64°E 444 (m asl)

04:00 07:00 10:00 13:00 16:00 19:00 22:00
7° 7° 12° 13° 13° 16° 6°

10 9 9 10 9 10 12
0% 6% 19% 21% 27% 26% 36%

rainSPOT Radius: 15 km
INSECT MANAGEMENT

Solutions based on automatic recognition:

• Detection/Identification of insects
• Counting the insects and following growth of population
• Supporting decision when to start with spraying – alarm at certain threshold
• Monitoring distribution of insects at your fields
CROP MONITORING

The field camera shows the field conditions, growth of the crop, attacks of the birds and weather in the own fields remotely. It combines the documentation and permanent observation, weather data and other important data.