Dry & irrigated contrasts in the morning transition

Jenn Brooke

Methods:
Els Plans & La Cendrosa
Radio soundings: 04Z-09Z
7 IOPs (IOP1-3, 5-7, 11)
Regional modelling

Data thanks:
J. Price, S. Osborne, J. McGregor
O. Hartogensis
G. Canut, A. Roy
Westerly flow IOPs & short irrigated canopy:
Buoyancy flux \( \times 2 \) magnitude (4.3 m\(^2\) s\(^{-3}\) vs 10.1 m\(^2\) s\(^{-3}\))
- Natural site flux cross-over: T+55min (after sunrise)
- Irrigated site flux cross-over: T+90min (after sunrise)
> 35 minute delay at La Cendrosa

Anticyclonic IOPs & taller irrigated canopy:
Buoyancy flux \( \times 5 \) magnitude (1.6 m\(^2\) s\(^{-3}\) vs 8.9 m\(^2\) s\(^{-3}\))
- Natural site flux cross-over: T+60min (after sunrise)
- Irrigated site flux cross-over: T+140min (after sunrise)
> 70 minute delay at La Cendrosa
Irrigation impact on the morning transition

Westerly flow IOPs (1-3):
- Colder profiles through morning transition
- Rapid BL growth & deeper BL at ‘onset’
- Irrigation differences in SBL at sunrise
  - $T_{\text{diff}_{\text{irrig}}} \approx 2K$ at ‘onset’

Anticyclonic IOPs (5-7,11):
- Increasing stability and stronger surface inversion
- More prominent LLJ
- Shallower BL depths at ‘onset’
  - $T_{\text{diff}_{\text{irrig}}} \approx 3.4K$ at ‘onset’

Profiles at sunrise & (approx.) convective onset (analysis underway to improve definition of onset)
Running daily 2.2km forecasts Unified Model (UM)
Running 333m forecasts for July SOP
With & without irrigation
Regional atmosphere & land configurations (RAL2, RAL3)
Single column modelling (RAL2, RAL3)