Climate & Weather Monitoring

Considerations for observation network designs

Jeremy Usher
Chief Technical Advisor on Alternative Technologies for Climate Information Systems, CIRDA

October 14, 2014
Why are we here?
Patient is sick!

Rising Temperature

**Cause**
- Rising Greenhouse Gases (GHG)

**Long term remedy**
- Fix cause at source
- Reduce GHGs
- Focus of other programs
- Temperature / Climate measurement done!

**Near term remedy**
- Treat symptoms of the illness
- Reduce real, local impact
- Help society adapt to changing climate

Focus of our programs
- Might require different tools!
How can we define?

- Same general field
- Many subtle differences
- Sweeping implications

Observation Network Design

Applications … Cost … Sustainability
Generalizing…

Weather is Climate Variability

Weather IS Climate at a local scale

Weather is MY Climate reality

Small changes in Climate  Big changes in my Weather
Climate

Weather

More Precision

Millennial

Seasonal

Decadal

Weekly

Daily

Hourly

Seconds

Less Precision

OBSERVATION PRECISION
Climate

Fewer Stations Required

$50,000

$1,000,000

20

DENSITY

Weather

More Stations Required

$50,000

$1,000,000

20

DENSITY

$10,000

$1,000,000

20
Recommendation: Keep It Simple & Consistent

Temperature, Wind Speed/Direction, Relative Humidity, Precipitation, Barometric Pressure, Solar Radiation. Soil Temperature/Moisture for Ag.
Climate

Weather

ALONE

- Location
- Telecommunications
- Power
- Physical Security
- Field Engineering
- Maintenance
- Data Management
- Calibration

SHARED

OPERATIONS
What matters?
- Graphic Design
- Ease of use
- Local data
- Timely data
- “Simple” data
- Accurate data

APPLICATIONS: MOBILE
Reusable Data!

What matters?
- Local data
- Timely data
- “Simple” data
- Accurate data
- Derived data

Same basic data, with some repackaging.

APPLICATION: AGRICULTURE
Innovative Technology!

Radar-based Solution

Lightning Based Solution

1/10 the Cost

Severe Weather Warning System
Observation Network Technology

- Compact, all-in-one sensor package
- Limited, but consistent measurement variables
- Innovative severe weather package
- Near-real time data transmission
- Delivers accuracy, not precision
- Large coverage area, high density
- Establish infrastructure partnership (mobile telecommunications)
- Build network, then move focus to sustainability applications

RECOMMENDATIONS
Working Together

How can CIRDA help?
- Network design ideas
- Tech recommendations
- Best practice sharing
- Purchasing power
- Partner negotiation
- Cross border data sharing
- Many more!

REGIONAL COORDINATION
Patient is sick!

Rising Temperature

Cause
- Rising Greenhouse Gases

Long term remedy
- Fix cause at source
- Reduce GHGs
- Focus of other programs
- Temperature measurement done!

Near term remedy
- Treat symptoms of the illness
- Reduce real, local impact
- Help society adapt to changing climate
- Focus of our programs
- Will require different tools!
Thank you!

Jeremy Usher
Chief Technical Advisor on Alternative Technologies for Climate Information Systems, CIRDA