LI-7200 AT A GLANCE
- Fast CO₂/H₂O analyzer for low power operation with short intake tube
- Design optimized for Eddy Covariance, but works with many applications
- Fast air temperatures and pressure measured in the cell enable a short intake
- Low sensitivity to cell contamination enables field operation with intake filter for months at a time
- Tool-free cleanable cell for on-tower inspection & cleaning with one hand
- 5 prototypes field-tested in 4 experiments in 2006 - 2010

GOOD FREQUENCY RESPONSE
- Frequency loss of LI-7200 was small, but slightly higher than LI-7500 (on average, 12% vs. 8% for 0.3 intake, 13% vs. 9% for 1 m)
- It is due to small high frequency attenuation by short tube
- For comparison, frequency loss for LI-7000 with 3.5 m intake was between 15% and 30%

CONCENTRATIONS & FLUXES
- Typical field data for ryegrass in Nebraska and for wetland in Florida are shown below
- Instantaneous 10 Hz concentration values in ng/m³ were within 2 ppm, and mostly within 1 ppm, of standard LI-7500
- Mean concentrations were within 4% of the standard LI-7500
- Hourly CO₂ and H₂O fluxes were within 0.5% of the standard (LI-7000 and LI-7500, respectively) in all experiments
- Observed 1.5% difference was not statistically significant, for P=0.05

NEGLECTIBLE DATA LOSS
- Flux data loss was at about 7.8% for open-path LI-7500 mostly due to precipitation, with 0% loss during the event of rain
- Data loss from closed-path analyzer LI-7000 were below 0.5%
- LI-7000 data loss was close to closed-path LI-7500, but with power and maintenance requirements close to open-path LI-7500

LI-7200
- CO₂ flux
  - Total for all experiments 8% < 1% < 1%
  - During precipitation 75% 0% 0%
- H₂O flux
  - Total for all experiments 7% < 1% < 1%
  - During precipitation 75% 0% 0%

LI-7500A AT A GLANCE
- Fast CO₂/H₂O open-path analyzer with low power operation and low-power dissipation
- Design optimized for Eddy Covariance, but works with other flux and monitoring applications
- Low power dissipation achieved by two temperature control settings: for cold and for warm conditions
- Low power dissipation settings lead to less system power consumption in extreme environments
- Low power dissipation also leads to less or no heating of the sample air in the instrument path
- Low sensitivity to cell contamination enables long deployments w/o cleaning

LOW POWER DISSIPATION
- New open-path CO₂/H₂O gas analyzer, LI-7500A, is based on the LI-7500 model modified to produce substantially less heat during extremely cold conditions
- This is achieved by low chopper motor housing temperature setting for cold climates at 5°C, in addition to a standard setting of 30°C
- The use of two settings help to always keep power dissipation from the instrument in single Watts
- It is because electronics heating of the window surfaces is a small fraction of total power coming to the instrument

REDUCED HEAT DISSIPATION
- 1-min averages 7-10°C
  - 5°C setting led to 30% reduction in the 1-minute average temperature gradient between bottom window and the atmosphere
  - The advantage of 5°C setting becomes more and more important as it gets colder

CONCLUSIONS
- Four field experiments with five LI-7200 prototypes over 2006-2010 demonstrated that the short-tube-enabled analyzer design, with fast T and P measured in the cell, utilizes strengths of both closed-path and open-path designs at the same time.
- LI-7200 has following advantages, similar to closed-path analyzers:
  - minimal data loss due to precipitation and icing
  - no surface heating issues
  - improved water specs due to absence of solar filter
- LI-7200 has following advantages, similar to open-path analyzers:
  - small, easy correctable flux attenuation loss in short intake
  - infrequent calibration/minimum maintenance requirements
  - low power consumption when used with short intake tube
- Two prototypes of LI-7500A were tested in the field and the lab in 2009-2010. Two regimes of the temperature control were examined across wide ranges of temperatures. Both external heat dissipation and power demand were significantly reduced when 5°C setting was activated under cold ambient conditions.