

## Appendix A. Acronym List and Glossary

### Acronym Glossary

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8		
9	<b>AET</b>	Apparent equivalent temperature
10		
11	<b>ANPP</b>	Aboveground net primary productivity
12		
13	<b>AOGCM</b>	Atmosphere-ocean general circulation models
14		
15	<b>BT</b>	Body temperature
16		
17	<b>CCSM</b>	Community Climate System Model
18		
19	<b>CCSP</b>	U.S. Climate Change Science Program
20		
21	<b>CGC</b>	Canadian Global Coupled Model
22		
23	<b>DOY</b>	Day of year
24		
25	<b>ET</b>	Evapotranspiration
26		
27	<b>ENSO</b>	El Niño-Southern Oscillation
28		
29	<b>FACE</b>	Free-Air CO <sub>2</sub> Enrichment
30		
31	<b>GCM</b>	General Circulation Model
32		
33	<b>GFDL</b>	Geophysical Fluid Dynamics Laboratory
34		
35	<b>HadCM2</b>	Hadley Centre for Climate Prediction and Research's Climate Model 2
36		
37	<b>HCN</b>	Historical Climatology Network
38		
39	<b>HI</b>	Harvest index
40		
41	<b>HLI</b>	Heat load index
42		
43	<b>IBP</b>	International Biome Project
44		
45	<b>IPCC</b>	Intergovernmental Panel on Climate Change
46		
47	<b>IPCC AR4</b>	Intergovernmental Panel on Climate Change 4 <sup>th</sup> Assessment Report
48		
49	<b>IPCC TAR</b>	Intergovernmental Panel on Climate Change 3rd Assessment Report
50		
51	<b>IPM</b>	Integrated pest management
52		

1	<b>LAI</b>	Leaf area index
2		
3	<b>LTER</b>	Long Term Ecological Research
4		
5	<b>LWSI</b>	Livestock weather safety index
6		
7	<b>NCAR</b>	National Center for Atmospheric Research
8		
9	<b>NEON</b>	National Ecological Observatory Network
10		
11	<b>NPP</b>	Net primary productivity
12		
13	<b>NRCS</b>	Natural Resources Conservation Service
14		
15	<b>NRCS SCAN</b>	Natural Resources Conservation Service Soil Climate and Analysis Network
16		
17	<b>NRC</b>	National Research Council
18		
19	<b>NWS COOP</b>	National Weather Service Cooperative Observer Program
20		
21	<b>PCMDI</b>	(Lawrence Livermore National Laboratory's) Program for Climate Model Diagnosis and Intercomparison
22		
23		
24	<b>PDO</b>	Pacific Decadal Oscillation
25		
26	<b>PE</b>	Potential evaporation
27		
28	<b>ppb</b>	Parts per billion
29		
30	<b>ppm</b>	Parts per million
31		
32	<b>RH</b>	Relative humidity
33		
34	<b>RMSE</b>	Root mean square error
35		
36	<b>RR</b>	Respiration rate
37		
38	<b>SOM</b>	Soil organic matter
39		
40	<b>SRAD</b>	Solar radiation
41		
42	<b>SRES</b>	Special Report on Emissions Scenarios
43		
44	<b>SWE</b>	Snow water equivalent
45		
46	<b>TBCA</b>	Total carbon allocation belowground
47		
48	<b>THI</b>	Temperature-humidity index
49		
50	<b>USDA</b>	United States Department of Agriculture
51		
52	<b>USGS</b>	United States Geological Survey
53		
54	<b>USGS HCDN</b>	United States Geological Survey Hydro-Climatic Data Network
55		
56	<b>VFI</b>	Voluntary feed intake

- 1
- 2 **VIC** Variable Infiltration Capacity
- 3
- 4 **VOC** Volatile organic compound
- 5
- 6 **VPD** Vapor pressure deficit
- 7
- 8 **WS** Wind speed
- 9
- 10 **WUE** Water use efficiency
- 11
- 12
- 13

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## 1 **Glossary**

### 2 3 4 **Anthesis**

5 The period during which a flower is fully open and functional.

### 6 7 **Boll**

8 The seed-bearing capsule of certain plants, especially cotton and flax.

### 9 10 **C3 species**

11 Almost all plant life on Earth can be broken into two categories based on the way they assimilate carbon  
12 dioxide into their systems. During the first steps in CO<sub>2</sub> assimilation, C3 plants form a pair of  
13 three carbon-atom molecules. C3 species continue to increase photosynthesis with rising CO<sub>2</sub>. C3  
14 plants include more than 95 percent of the plant species on Earth.

### 15 16 **C4 species**

17 C4 plants initially form four carbon-atom molecules. C4 plants include such crop plants as sugar cane and  
18 corn. They are the second most prevalent photosynthetic type, and do not assimilate CO<sub>2</sub> as well as C3  
19 plants.

### 20 21 **Carbon sink.**

22 A carbon reservoir. Carbon sinks include the oceans, and plants and other organisms that remove carbon  
23 from the atmosphere via photosynthetic processes.

### 24 25 **Carbon source**

26 The term describing processes that add carbon dioxide to the atmosphere.

### 27 28 **Carbon sequestration**

29 The term describing processes that remove carbon dioxide from the atmosphere.

### 30 31 **CO<sub>2</sub> enrichment**

32 Addition of CO<sub>2</sub> to the atmosphere.

### 33 34 **Coefficient of variation of annual runoff**

35 A measure of the variability of runoff

### 36 37 **Complementary hypothesis**

38 This hypothesis states that trends in actual evaporation and pan evaporation should be in opposite  
39 directions.

### 40 41 **Cucurbits**

42 Any of various mostly climbing or trailing plants of the family Cucurbitaceae, which includes the squash,  
43 pumpkin, cucumber, gourd, watermelon, and cantaloupe.

### 44 45 **Endophyte**

46 A plant living within another plant, usually as a parasite.

### 47 48 **Evaporation paradox**

49 Temperature, precipitation, stream flow and cloud cover records indicate that warmer, rainier weather is  
50 now more common in many regions of the world. However, pan evaporation readings, taken at weather  
51 stations, indicate that less moisture has been rising back into the air from these pans.

### 52 53 **Evapotranspiration**

1 The sum of evaporation and plant transpiration. Evaporation accounts for the movement of water to the air  
2 from sources such as the soil, canopy interception, and water bodies. Transpiration accounts for the  
3 movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves.  
4

#### 5 **Free-Air CO<sub>2</sub> Enrichment (FACE)**

6 FACE is a method and infrastructure used to experimentally enrich the atmosphere enveloping portions of a  
7 terrestrial ecosystem with controlled amounts of carbon dioxide (and in some cases, other gases), without  
8 using chambers or walls.  
9

#### 10 **Forb**

11 A broad-leaved herb (not a grass), especially one growing in a field, prairie, or meadow.  
12

#### 13 **Global dimming**

14 The gradual reduction in the amount of global direct irradiance at the Earth's surface that was observed for  
15 several decades after the start of systematic measurements in 1950s  
16

#### 17 **Herbivores**

18 Animals that feed chiefly on plants.  
19

#### 20 **Homeostasis**

21 The scientific study of periodic biological phenomena, such as flowering, breeding, and migration, in  
22 relation to climatic conditions.  
23  
24

#### 25 **Instream flow**

26 The term used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a  
27 specific location for a defined time, and typically following seasonal variations. Instream flows are usually  
28 defined as the stream flows needed to protect and preserve instream resources and values, such as fish,  
29 wildlife and recreation. Instream flows are most often described and established in a formal legal  
30 document, typically an adopted state rule.  
31

#### 32 **Irrigation Modes**

33 *Drip* irrigation allows water to drip slowly to the roots of plants through a network of valves, pipes, tubing,  
34 and emitters.

35 *Flood* irrigation pumps water onto the fields. The water then flows freely along the ground among the  
36 crops.

37 *Spray* irrigation relies on machinery to spray water in all directions.  
38

#### 39 **Latent heat**

40 The heat required to change the phase of a substance, for example a solid to vapor (sublimation), liquid to  
41 vapor (vaporization) or solid to liquid (melting); the temperature does not change during these processes.  
42 Heat is released for the reverse processes, for example vapor to solid (frost), liquid to solid (freezing), or  
43 vapor to liquid (condensation).  
44

#### 45 **Leaf area index (LAI)**

46 The ratio of total upper leaf surface of a crop divided by the surface area of the land on which the crop  
47 grows.  
48

#### 49 **Lignin**

50 An organic substance that, with cellulose, forms the chief part of woody tissue.  
51

#### 52 **Lysimeter**

53 A device for collecting water from the pore spaces of soils, and for determining the soluble constituents  
54 removed in the drainage.  
55

#### 56 **Mutualistic relationship**

1 A positive, reciprocal relationship between two species. Through this relationship, both species enhance  
2 their survival, growth or fitness.

3  
4 **Net primary productivity (NPP)**

5 The ratio of all biomass accumulation and biomass losses in units of carbon, weight or energy, per land  
6 surface unit, over a set time interval (usually a year).

7  
8 **Pan evaporation**

9 Pans used to determine the quantity of evaporation at a given location. These are generally located in  
10 agricultural areas, and have been used as an index to potential evaporation.

11  
12 **Panicle**

13 The complete assembly of spikelets on a rice plant.

14  
15 **Phenology**

16 The study of periodic biological phenomena (flowering of plants, breeding, and species migration) in  
17 relation to climatic conditions.

18  
19 **Potential Evapotranspiration**

20 A representation of the environmental demand for evapotranspiration and represents the evapotranspiration  
21 rate of a short green crop, completely shading the ground, of uniform height and with adequate water status  
22 in the soil profile. It is a reflection of the energy available to evaporate water, and of the wind available to  
23 transport the water vapor from the ground up into the lower atmosphere.

24  
25 **Runoff ration**

26 The total amount of runoff divided by the total moisture that falls during a precipitation event.

27  
28 **Ruminant**

29 Even-toed, cud-chewing, hoofed mammals of the suborder *Ruminantia*, such as domestic cattle.

30  
31 **Sensible heat**

32 Heat that can be measured by a thermometer.

33  
34 **Spikelet**

35 The individual places on a rice plant where a grain develops.

36  
37 **Stomatal**

38 One of the minute pores in the epidermis of a leaf or stem through which gases and water vapor pass.

39  
40 **Tiller**

41 New shoots that develop at the base of the plant.