ACMO (AgMIP Crop Model Output)

The primary purpose of the ACMO (AgMIP Crop Model Output) file is to provide a means of harmonizing crop model simulation outputs for input to regional and global economic models. The simulated model outputs need to be consistent between models and be fully linked to the data sources and other metadata to fully describe the experiment, climate scenario, management scenario, etc. Links to the original data used to run the models must be provided such that the simulation can be repeated.

Like the ACE data for crop model inputs, the ACMO harmonized data definitions are based on the ICASA Master Variable list.

The figure below shows the flow of data from raw data to ACE harmonized format → translated crop model-ready data → crop model outputs → harmonized ACMO data. Note that the ACMO simulated metadata is produced by the user interface at the time that model-ready data are translated for the crop models. This file is then combined with the simulation output data for each crop model to create the ACMO.csv harmonized output file that is read into the ACMO database.

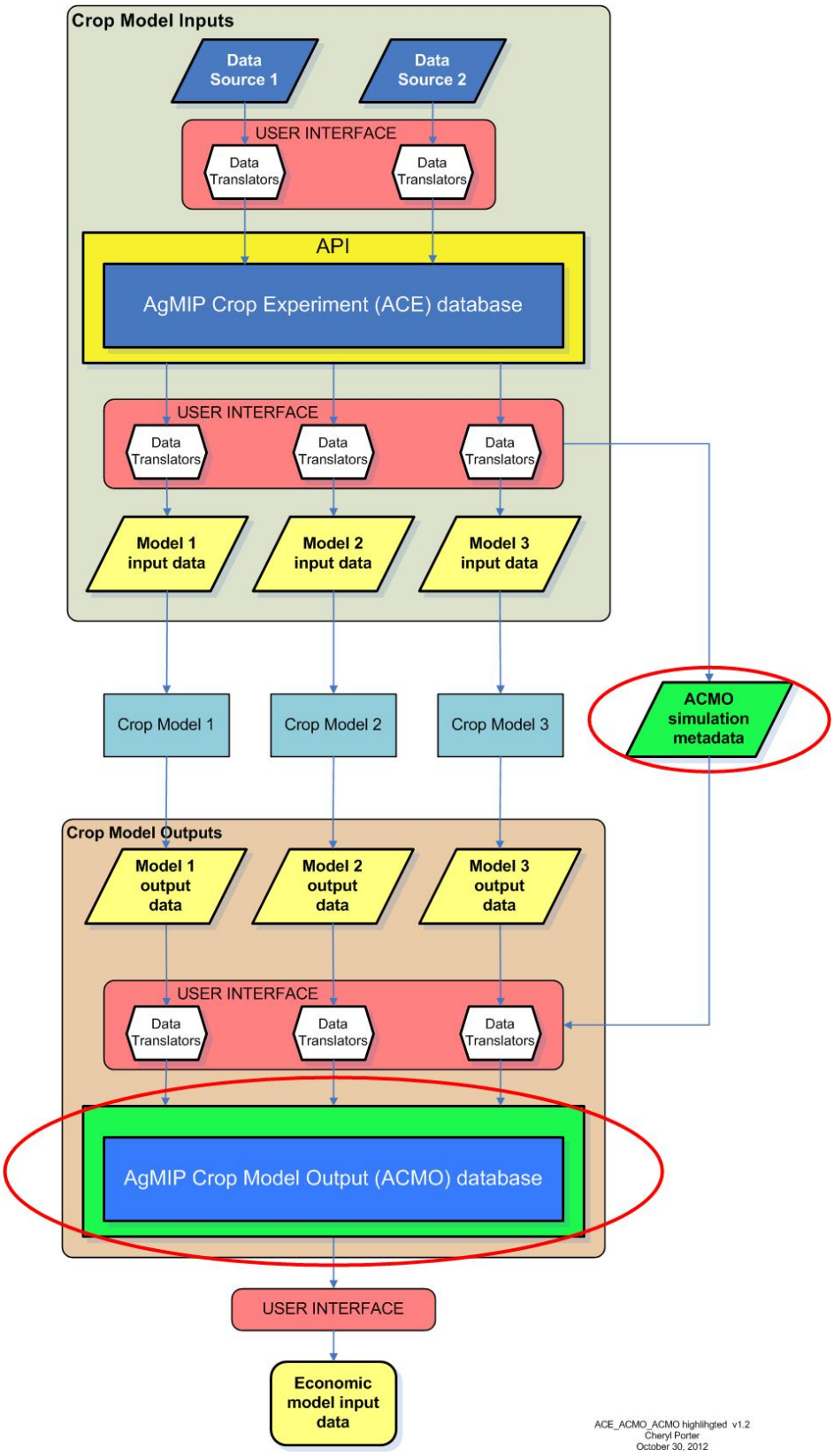
ACMO filenames are generated based on metadata in the file and contain codes for region, stratum, climate scenario, RAP, management regimen identification, and model used for simulation.

`Filename = ACMO-Reg_ID-STRATUM-CLIM_ID-RAP_ID-MAN_ID-MODEL_ID`

Examples:

`ACMO-Machakos-1-0XFX-0-0-DSSAT.csv` for baseline simulation,

`ACMO-Machakos-1-MTFA-3-2-APSIM.csv` for future conditions.


Crop Model Inputs
Data Source 1
Data Source 2
USER INTERFACE
Data Translators
Data Translators
API
AgMIP Crop Experiment (ACE) database
USER INTERFACE
Data Translators
Data Translators
Data Translators
Model 1 input data
Model 2 input data
Model 3 input data
Crop Model 1
Crop Model 2
Crop Model 3
ACMO simulation metadata
Crop Model Outputs
Model 1 output data
Model 2 output data
Model 3 output data
USER INTERFACE
Data Translators
Data Translators
Data Translators
AgMIP Crop Model Output (ACMO) database
USER INTERFACE
Economic model input data
ACE_ACMO_ACMO highlihgted v1.2
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ACMO Data Definitions

The variables in the table below have been defined as the standard ACMO variables. Data translation tools will be developed for each participating AgMIP crop model which take standard crop model output data and generate a csv (comma delimited) file containing these data.

Most of these data consist of metadata, which describe the management and climate scenarios, and the base data upon which the scenarios are applied. These metadata will be supplied to each crop model as data are translated from ACE harmonized format into model-ready format by the data translation tools. These metadata will be supplied in the form of a comma-delimited ACMO_meta.dat file.

RED TEXT indicates that these are not ICASA variables and are not included in the ACE database. These values are supplied by user inputs to the DOME data.

BLUE TEXT indicates that these are output from the crop model. All other variables are generated from the ACE and DOME data in the ACMO_meta.dat file which is created as data are translated to the crop model input formats.

ICASA code display	DEFINITIONS	UNITS	COMMENT
SUITE_ID	ID for suite of sites or experiments	–	
EXNAME	Name of experiment, field test or survey	–	
FIELD_OVERLAY	Field Overlay (DOME) ID	–	
SEASONAL_STRATEGY	Seasonal Strategy (DOME) ID	–	
ROTATIONAL_ANALYSIS	Rotational Analysis (DOME) ID	–	(Not yet implemented)
BATCH_DOME	BATCH (DOME) ID	–	
BATCH_RUN#	Batch simulation number	number	
RUN#	Simulation run number	number	
TRT_NAME	Treatment name for multiple treatment groups of experiments	–	
CLIM_ID	Climate ID indicating time period, emissions scenario, GCM, downscaling method and type of scenario	4-char lookup code	DOME metadata
CLIM_REP	Weather replication number used for multiple realizations of generated weather data	number	DOME metadata
REG_ID	Region ID	lookup code	DOME metadata

STRATUM	ID for sub-regional strata	number	DOME metadata
RAP_ID	Representative Agricultual Pathway identifier	lookup code	DOME metadata
MAN_ID	Management ID, for multiple management regimens withing a RAP / Region / Time period	lookup code	DOME metadata
INSTITUTION	Names of institutions involved in collection of field or survey data	–	
ROTATION	Crop rotation indicator (=1 for continuous, multi-year simulation, =0 for single year simulations with multiple initializations)	number	
WSTA_ID	Weather station identifier to link to site information	–	
SOIL_ID	Soil ID (alphanumeric code)	lookup code	
FL_LAT	Site Latitude	decimal degrees	
FL_LONG	Site Longitude	decimal degrees	
CRID_text	Crop type (common name)	–	Lookup from CRID, crop ID
CUL_ID	Crop model-specific cultivar ID	lookup code	
CUL_NAME	Crop variety name	–	
SDAT	Simulation start date	date (yyyy-mm-dd)	
PDATE	Planting date	date (yyyy-mm-dd)	
HWAH	Observed harvested yield, dry weight	kg/ha	
CWAH	Observed total above-ground biomass at harvest	kg/ha	
HDATE	Observed harvest date	date (yyyy-mm-dd)	
IR#C	number of irrigation events	#	
IR_TOT	Total amount of irrigation	mm	
IROP_text	Type of irrigation application	–	
FE_#	Total number of fertilizer applications	#	
FEN_TOT	Total N applied	kg[N]/ha	
FEP_TOT	Total P applied	kg[P]/ha	

FEK_TOT	Total K applied	kg[K]/ha	
OM_TOT	Manure and applied oganic matter	kg/ha	
TI_#	Total number of tillage applications	#	
TIIMP_text	Tillage type	–	
EID	Experiment ID	Hashtag	
WID	Weather station hashtag	Hashtag	
SID	Soil data hashtag	Hashtag	
DOID	DOME ID for Overlay	Hashtag	
DSID	DOME ID for Seasonal	Hashtag	
DRID	DOME ID for Rotational	Hashtag	
BDID	DOME ID for Batch DOME	Hashtag	
CROP_MODEL	Short name of crop model used for simulations (e.g., DSSAT, APSIM, Aquacrop, STICS, etc.)	–	Assigned by crop model translator
MODEL_VER	Model name and version number of the crop model used to generate simulated outputs	–	Assigned by crop model translator
HWAH_S	Simulated harvest yield, dry matter	kg/ha	Simulated model output
CWAH_S	Simulated above-ground biomass at harvest, dry matter	kg/ha	Simulated model output
ADAT_S	Simulated anthesis date	yyyy-mm-dd	Simulated model output
MDAT_S	Simulated maturity date	yyyy-mm-dd	Simulated model output
HADAT_S	Simulated harvest date	yyyy-mm-dd	Simulated model output
LAIX_S	Simulated leaf area index, maximum	m2/m2	Simulated model output
PRCP_S	Total precipitation from planting to harvest	mm	Simulated model output
ETCP_S	Simulated evapotranspiration, planting to harvest	mm	Simulated model output
NUCM_S	Simulated N uptake during season	kg/ha	Simulated model output
NLCM_S	Simulated N leached up to harvest maturity	kg/ha	Simulated model output
EPCP_S	Transpiration, cumulative from planting to harvest	mm	Simulated model output
ESCP_S	Evaporation,soil, cumulative from planting to harvest	mm	Simulated model output