Protocol for the submission of AgMip-wheat results in the context of the BADJAM activity

Experiment #1- 1980-1984 bias-adjusted climate simulations

1. Introduction

In order to make things incremental and smoothest for all, we decided to start by distributing to the AgMIP community this first batch of data. They relate to the bias adjustment (BA) of the period 1980-1984 obtained by training the methodologies on the 1985-2006 period.

The reference dataset for the bias adjustment is AGMERRA.

When the crop model results for experiment #1 will be received by the JRC, a second batch of data will be provided wherein the same bias adjustment will be applied to projections up 2100 (RCP4.5 and 8.5). JRC will start the analyses while the community can work on the projections.

2. Description of the input data, where they are and file naming

13 independent bias adjustment methods (Table 1.) have been applied to 8 climate simulations (Table 2.) for the 21 AgMIP sites listed in Table 5. .

Table 1. People and groups (BADJers) involved the treatment of the climate data, and the various methodologies applied listed also in the references.

BADJer	Institution acronym	Methods acronym			
Alex Cannon, *Environment and Climate Change Canada, Canada*	ECCC	MBCn	MBCp	MBCp	QDM
Jose Manuel Gutierrez Llorente & Maliane Turibe, *University of Cantabria, Spain*	UCA	EQM	EQMs		
Mathieu Vrac *, Soullivanh Thao* , Harilaos Loukos & Thomas Noel **LSCE/IPSL The Climate data factory, France*	IPSL	CDFt	R2D2		
Seth Mcginnes, *National Center of Atmospheric Research, USA*	NCAR	KDDM			
Martin Jury & Douglas Maraun, *University of Graz, Austria*	UG	QM	SDM		
Angelo Riccio, *Universita' Partenope, Italy*	UP	CDFT	REA		
Stefan Lange, *Potsdam Institute for Climate Impact Research*	PIK	ISIMIP3	ISIMIP3_ multi		

The data, arranged in AgMIP-wheat format, can be found at this URL:

https://jrcbox.jrc.ec.europa.eu/index.php/apps/files/?dir=/DATA%20AGMIP%201980-1984/AgMIP%20data&fileid=3315238

the data are organised in directories whose names are made of the name the institution the authors's of the bias adjustment belongs (Table 1. second column) and the acronym of the BA method (Table 1.).

Table 2. Climate model bias adjusted and chosen identifiers for the BADJAM activity

Climate model (CM)	BADJAM CM identifier
ICHEC-EC-EARTH/RCA4	ICHEC
MPI-M-MPI-ESM-LR/CCLM4-8-17	MPICCLM
MPI-M-MPI-ESM-LR/RCA4	MPIRCA4
MPI-M-MPI-ESM-LR/REMO2009	MPIREMO09
CSIRO-QCCCE-CSIRO-Mk3-6-0/RCA4	CSIRO
NCC-NorESM1-M/RCA4	NCCNor
IPSL-IPSL-CM5A-MR/RCA4	IPSL
NOAA-GFDL-GFDL-ESM2M/RCA4	NOAA

Table 3. Climate model bias adjusted and chosen identifiers for the BADJAM activity

List of directories with input data		
ECCC_MBCn	IPSL_R2D2	PIK_ISIMIP3_multi
ECCC_MBCp	NCAR_KDDM	
ECCC_MBCr	UG_SDM	
ECCC_QDM	UG_QM	
UC_EQM	UP_REA	
UC_EQMs	UP_CDFT	
IPSL_CDFt	PIK_ISIMIP3	

The data file naming works as follow:

BA author institution (Table 1.) _BA method (Table 1.) _CM identifier (Table 2.) _station identifier(Table 5.) .txt

For example: ECCC_MBCn_CSIRO_42.txt contains data from 1 January 1981 to 12 December 1984 for 7 variables (radiation, precipitation, wind speed, relative humidity, average, min and max temperatures) arranged according to AgMip format and bias adjusted by Alex Cannon (ECCC) according to the methodology MBCn for Alexandria. Variables that are not part of the bias adjusted set are not provided but yet identified by NA.

Every directory contains the files adjusted for all 8 models and 21 stations (168 data files). An exception in this respect is represented by the data contained in the directory UP_REA. Therein only 21 data files are contained since the data were obtained by the application of an assimilation procedure to correct the ensemble of all the climate data.

An additional AGMERRA directory can be found at the URL containing the original AGERRA data used as reference for the BA and listed as:

AGMERRA_ NBC_BASE_station identifier

where NBC (no bias correction) and BASE are added for symmetry with the other file naming.

3. Crop model run specs

All crop models are given an identifiers as from Table 4.

All participating crop models must be run at every individual location proving results specified below for each of the input data sets.

The selected sites are standard AgMIP sites used already in other AGmip activities. The crop management specs are those listed at:

At every location, sowing should start according to the specs as from Table 4. which were already used in a recent work of AgMip-wheat.

For every locations we are expecting the following output variables:

- **Yield** [Tons/ha] for each of the 5 years runs - variable identifier: **YLD**
- Phenology:
    - **sowing date** [Julian day] for the year preceding harvest- variable identifier: **SD**
    - **emergence date** [Julian day] - variable identifier: **ED**
    - **heading date** [Julian day] - variable identifier: **HD**
    - **flowering date** [Julian day] - variable identifier: **FD**
    - **maturity date** [Julian day] - variable identifier: **MD**
- **Biomass above ground** [Tons/ha]- variable identifier: **BAG**
- **LAI** at flowering - variable identifier: **LAI**
- Crop water Use (sowing-to-maturity integrated evap-trans) [mm] - variable identifier: **CWU**

It goes without saying that results for the above listed variables are expected starting from 1981

Output data files are expected for all models, methods and stations including the original AGMERRA set which will be used as reference.

Crop model identifier	Crop model name	Crop model developers/users
AU01	APSIM-Next Generation	Zhigan Zhao & Enli Wang
CN01	MCWLA-Wheat	Fulu Tao
CN02	WHEATGROW	Liujun Xiao Yanzhu
DE01	HERMES	Kurt C Kersebaum
DE02	SIMPLACE<LINTUL-5+> PM-SlimWater-SoilCN	Amit Srivastava & Thomas Gaiser
DE03	SIMPLACE<LINTUL-5+> P-Hillflow-SlimN&P-SoilCN	Sabine Seidel & Thomas Geiser
DE04	Expert-N-SPASS	Sebastian Gayler & Thilo Streck
DE05	Expert-N-GPASS	Tobias Weber
DE06	SIMPLACE<LINTUL-2>	Stefan Siebert & Ehsan Eyshi Rezaei
DE07	Expert-N-SUCROS	Eckart Priesack
DE08	MONICA	Claas Nendel & Xenia Specka
DE09	SIMPLACE<LINTUL-5+>	Heidi Webber & Frank Ewert
ES01	DSSAT CSM-CERES-Wheat	Margarita Riuz Ramos
ES02	AQUACROP	Margarita Garcia-Vila & Elias Fereres
FR01	SIRIUSQUALITY	Pierre Martre & Sibylle Dueri
IN01	INFOCROP	Naresh Kumar Soora
INT01	EPIC-I	BALKOVIC Juraj & Marijn van der velde
INT02	STICS	Giacomo De Sanctis & Dominique Ripoche
IR01	DSSAT CSM-CERES-Wheat	Saeid Soufizadeh
IT01	CropSyst Ver.3	Giacomo Trombi & Marco Moriondo
IT02	SSM-Wheat	Marco Bindi & Roberto Ferrise
NL01	LINTUL	Iwan Supit
PK01	CROPSYST	Mukhtar Ahmed
TN01	DSSAT CSM-CERES-Wheat	Amir Souissi
UK01	AquaCrop-UoN	Mohamed Jabloun
UK02	SPA-CRP	Andrew Revill & Nina Buchmann
UK03	SIRIUS	Mikhail A Semenov & Nimai Senapati
US01	DSSAT-Nwheat	Senthold Asseng & Chuang Zhao
US02	DSSAT CSM-CERES-Wheat	Philip D Alderman
US03	SALUS	Bruno Basso & Dumont Benjamin
US04	DSSAT CSM-CERES-Wheat	Gerrit Hoogenboom & Yujing Gao
US05	APEX	Jaehak Jeong

Table 4. Crop models names and identifiers, and modellers in charge of BADJAM/AgMIP

The data should be provided in a single file per BA method and climate model that must include all results for all stations arranged according to following format:

Crop model identifier (see Table 4.)
Climate model identifier (see Table 2.)
BA method name (see Table 1.)

1981

s01	**s02**	**s03**	**…….**		**s21**
YLD	YLD	….			
SD	SD	….			
ED	ED	….			
HD	HD	….			
FD	FD	….			
MD	MD	….			
BAG	BAG	…..			
LAI	LAI	….			
CWU	CWU	…..			

1982

s01	**s02**	**s03**	**s04**	**……**	**s21**
YLD	YLD	YLD	….		
SD	SD	SD	…..		
ED	ED	ED	…..		
HD	HD	HD	…..		
FD	FD	FD	…..		
MD	MD	MD	…..		
BAG	BAG	BAG	…..		
LAI	LAI	LAI	…..		
CWU	CWU	CWU	…..		

1983

s01	**s02**	**s03**	**……**	**s21**
YLD	YLD	…..		
SD	SD	…..		
ED	ED	…..		
HD	HD	…..		
FD	FD	…..		
MD	MD	…..		
BAG	BAG	…..		
LAI	LAI	…..		
CWU	CWU	…..		

1984

s01	**s02**	**s03**	**……**	**s21**

YLD ….. …..

In some of the locations (12 out of 21) crop management includes nitrogen stress application. If a model has the option to apply N stress, one simulation without nitrogen stress and one with will have to be provided. Two sets of results are therefore expected as described below.

The identifiers for these two runs are:

NNS (no nitrogen stress)

YNS (yes nitrogen stress)

The final file naming of crop model output will be according to the following format:

crop model identifier (see Table 4.) _BA author institution (see Table 1.) _BA method (see Table 1.) _climate model (see Table 2.) _nitrogen stress identifier(see above) .txt

so for example:

IN01_ECCC_MBCn_CSIRO_NNS.txt

contains the out put of INFOCROP, ran by Naresh Kumar, using the CSIRO climate models BA by Alex Cannon from (ECCC) **FOR ALL 21 STATIONS** where **no nitrogen stress was applied**.

whereas:

IN01_ECCC_MBCn_CSIRO_YNS.txt

contains the out put of INFOCROP, ran by Naresh Kumar, using the CSIRO climate models BA by Alex Cannon from (ECCC) **FOR THE 12 STATIONS (ONLY)** where **nitrogen stress was applied**.

Table 5. List of 21 stations with AgMIP identifiers. The last column contains the sowing dates. (*) under potential conditions i.e., no water and nitrogen stress (**) with water and nitrogen stress conditions. (no irrigation is applied, nitrogen is applied as per the management details provided by the AgMIP wheat). If nitrogen stress an option available for the model 2 runs per station are requested one with Nitrogen stress one without.

AgMIP_Weat station #	Country	Location	Irrigation (Y/N)	Cultivar	Vernali zreq uir.	Photop. sensitivity	Sowing date	N stress	
5	Egypt	Aswan	Y	Seri M 82	S	3	20/11	*	s1
9	The Netherlands	Wageningen	N	Aminda	W	6	5/11	*	s2
15	UK	Rothamsted	N	Avalon	W	3	15/10	*	s3
16	France	Estrées-Mons	N	Bermude	W	6	5/10	*	s4
17	France	Orleans	N	Apache	W	5	20/10	*	s5
18	Germany	Schleswig	N	Dekan	W	5	25/09	*	s6
27	Russia	Krasnodar	Y	Brigadier	W	6	15/09	*	s7
28	Ukraine	Poltava	Y	Brigadier	W	6	15/09		s8
29	Turkey	Izmir	Y	Basri Bey	S	4	15/11	*	s9
37	Spain	Ventas Huelma	N	Based on Basri Bey	S	4	18/12.–18/02	**	s10
38	Italy	Policoro	N	Based on Basri Bey	S	4	17/11 –17/01	**	s11
39	Italy	Libertinia	N	Based on Basri Bey	S	4	26/11 –26/01	**	s12
40	Greece	Thessaloniki	N	Based on Basri Bey	S	4	15/11– 15/01	**	s13
41	Hungary	Martonvásár	N	Based on Apache	S	5	15/11–15/01	**	s14
42	Romania	Alexandria	N	Based on Brigadier	W	6	7/10–7/12	**	s15
43	Bulgaria	Sadovo	N	Based on Brigadier	W	6	15/10–15/12.c	**	s16
44	Finland	Jokioinen	N	Based on Steklov-24	S	2	1/05–1/07	**	s17
48	Morocco	Sidi El Aydi	N	Based on Yecora	S	1	5/11–5/01	**	s18
49	Tunisia	Nabeul	N	Based on Pishtaz	S	2	1/12 –1/02	**	s19
50	Syria	Tel Hadya-Aleppo	N	Based on Pishtaz	S	2	20/11 –20/01	**	s20
52	Turkey	Ankara	N	Based on Fuller	W	4	1/09–1/11	**	s21