Evaluation of CHIRP/S Satellite Rainfall Products

Tufa Dinku

International Research Institute
for Climate and Society
Earth Institute | Columbia University

Outline

I. What?

II. Why?

III. How?

IV. Results (preliminary)

V. Summary

I. What ?

- **CHIRP (Climate Hazard Group Infrared Precipitation)**
- **CHIRPS is CHIRP with Station data**
  - From Climate Hazard Group at the University of California, Santa Barbara;
  - 5km spatial resolution;
  - Pentad and dekad totals;
  - Available from 1981 to current
  - Input: TIR + reanalysis + station observations
- **CHIRP/S are evaluated over East Africa**

II. How ?

- **CHIRP/S will be compared with point station measurement from Ethiopia(2006-2010), Tanzania(2006-2010), and Rwanda(1986-1990)**
  - **Not a standard validation**
- **CHIRP/S will also be compared with two similar products:**
  - **TAMSAT (Tropical Application of Meteorology using Satellite and other data) : from Unv. Reading, 10-daily, @ 4km, TIR-only.**
  - **ARC (Africa Rainfall Climatology) : from NOAA/CPC, daily @ 10km, TIR+GTS.**
  - **Qualitative comparison with ENACTS data.**

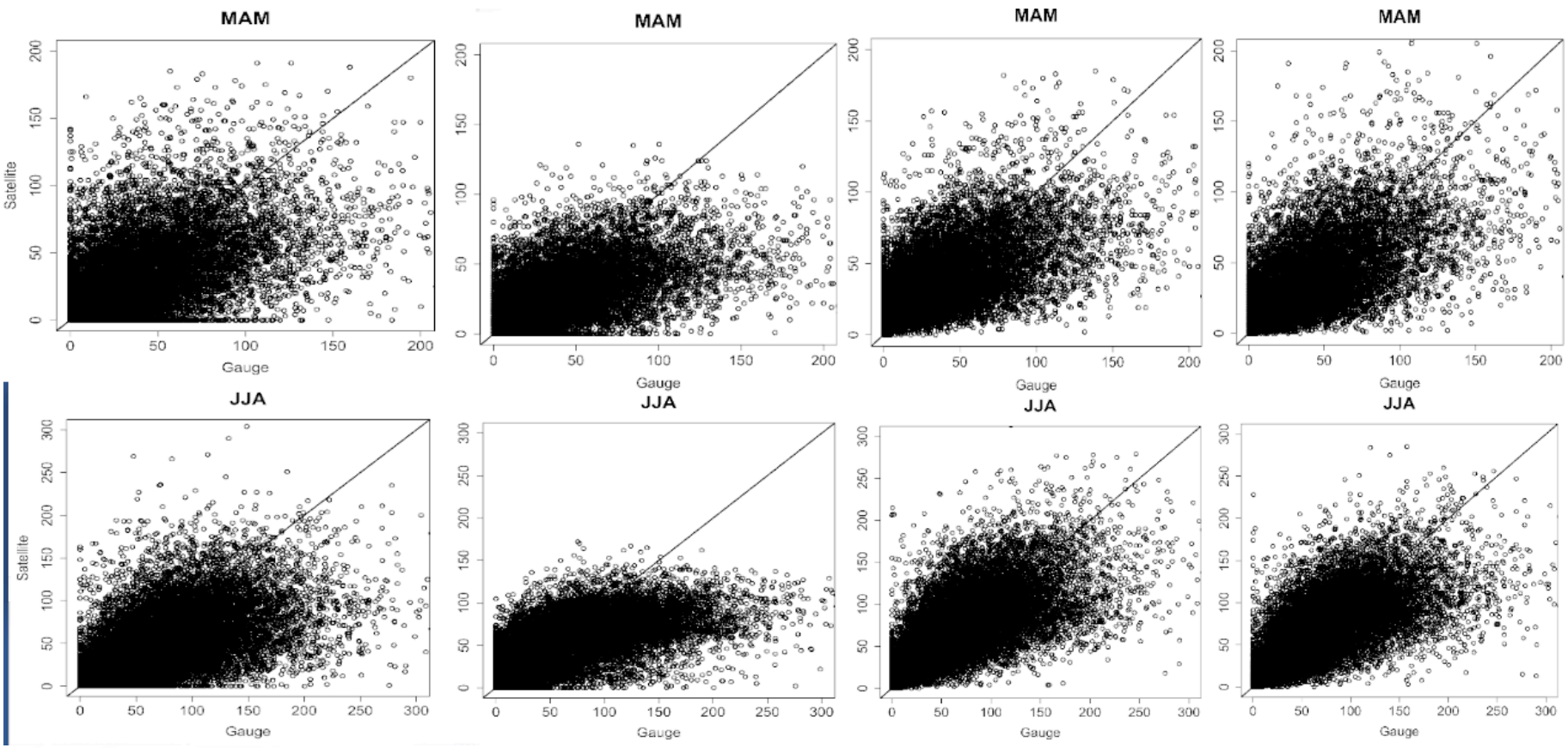
III. Why?

- **CHIRP/S is a unique products:**
  - Global coverage at high temporal and spatial resolutions
  - Time series goes back to 1981
  - CHIRP will have consistent time series (not not CHIRPS)
- **CHIRP/S will be used in the NASA/IDS-GHA project**

IV. Results

Ethiopia

ARC **TAMSAT** **CHIRP** **CHIRPS**



Results

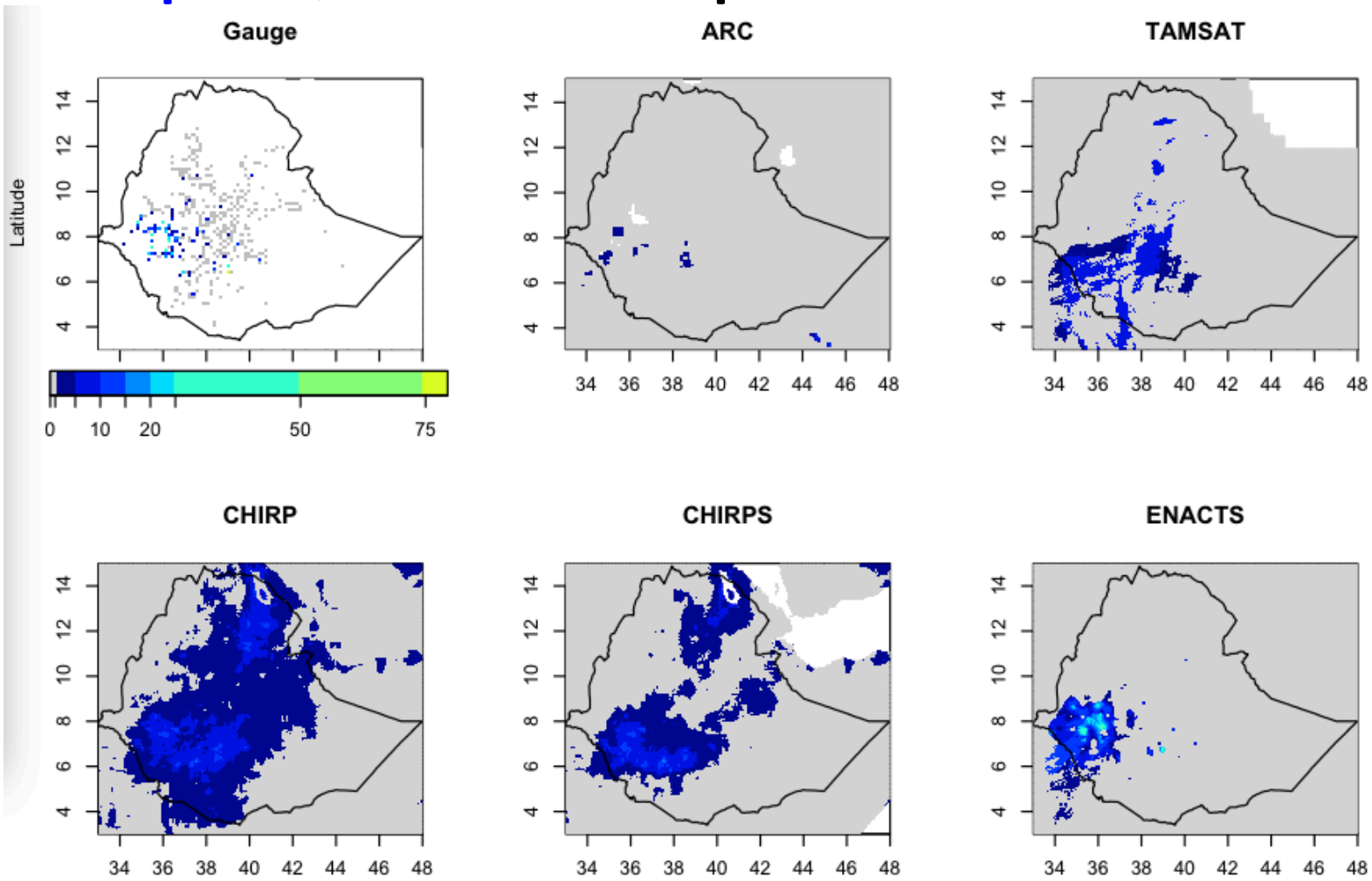
Ethiopia

MAM				
	CC	Bias	Skill	MAE
ARC	0.59	0.80	0.27	19.9
TAMSAT	0.63	0.68	0.32	18.8
CHIRP	0.65	1.01	0.42	19.1
CHIRPS	0.68	0.94	0.46	17.5

JJA				
	CC	Bias	Skill	MAE
ARC	0.58	0.67	0.11	36.7
TAMSAT	0.60	0.76	0.26	32.8
CHIRP	0.66	1.00	0.41	30.2
CHIRPS	0.68	0.94	0.44	28.8

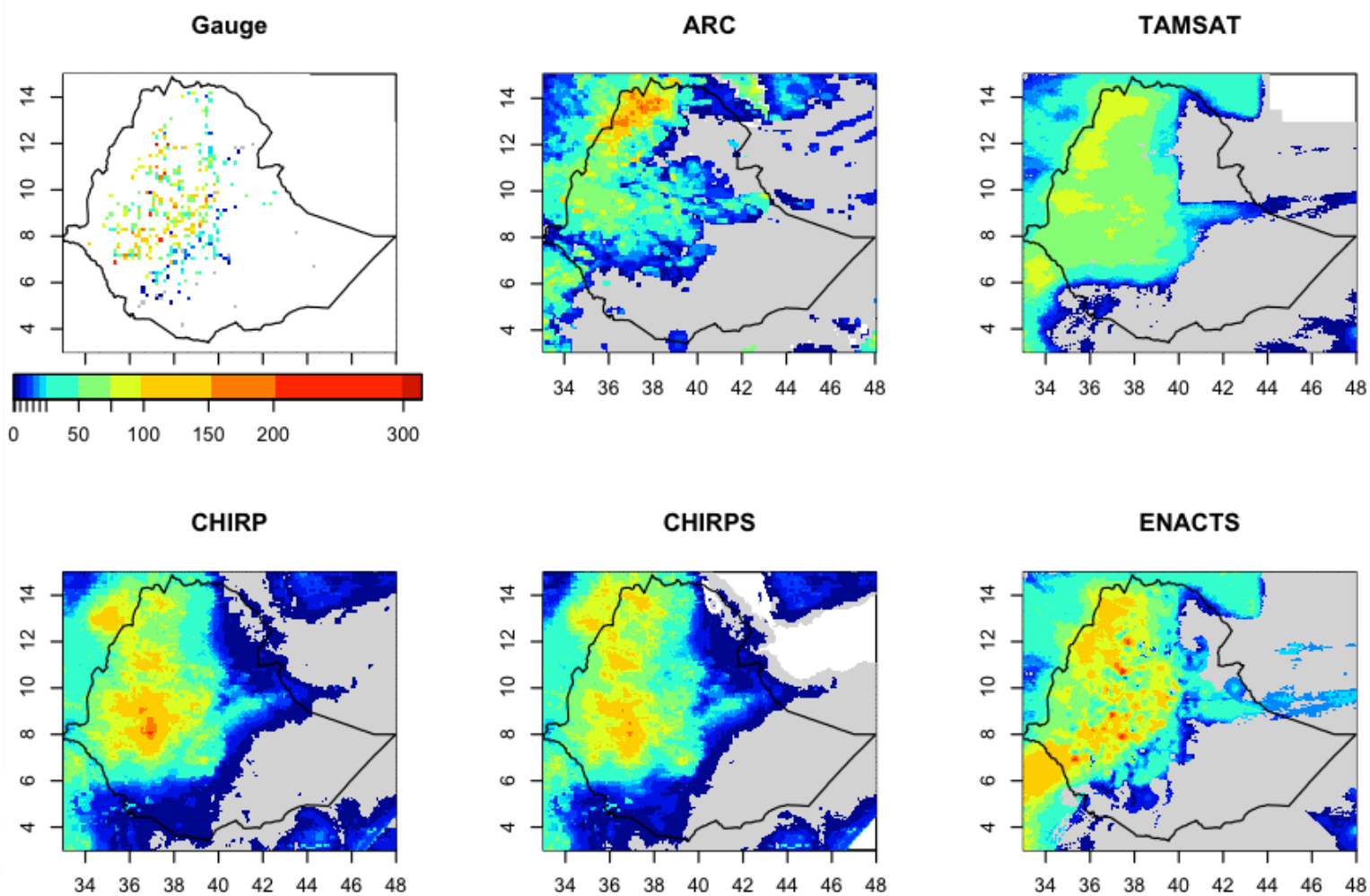
Results

Ethiopia: Qualitative Comparisons with ENACTS data



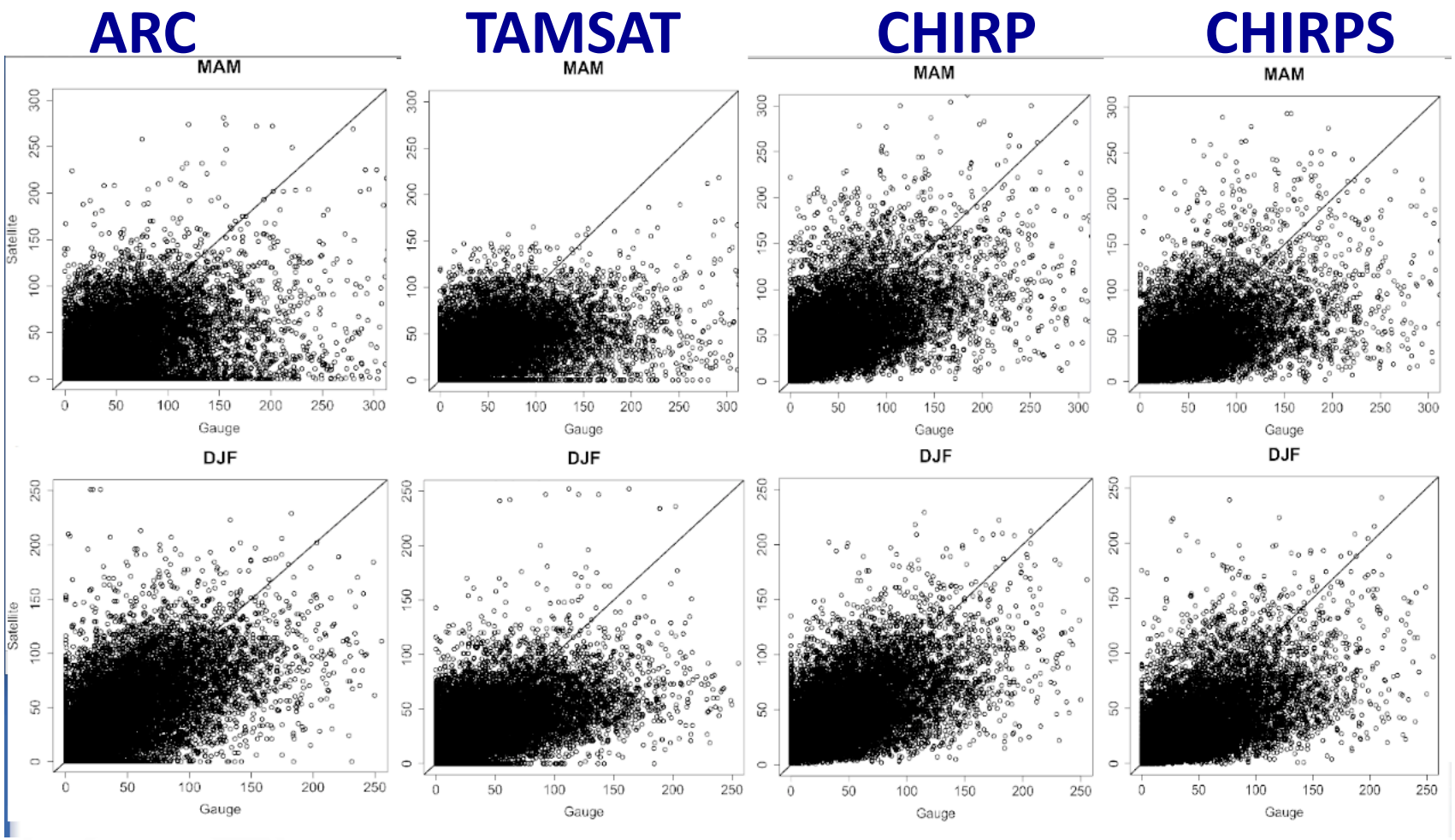
Results

Ethiopia: Qualitative Comparisons with ENACTS data



Results

Tanzania



Results

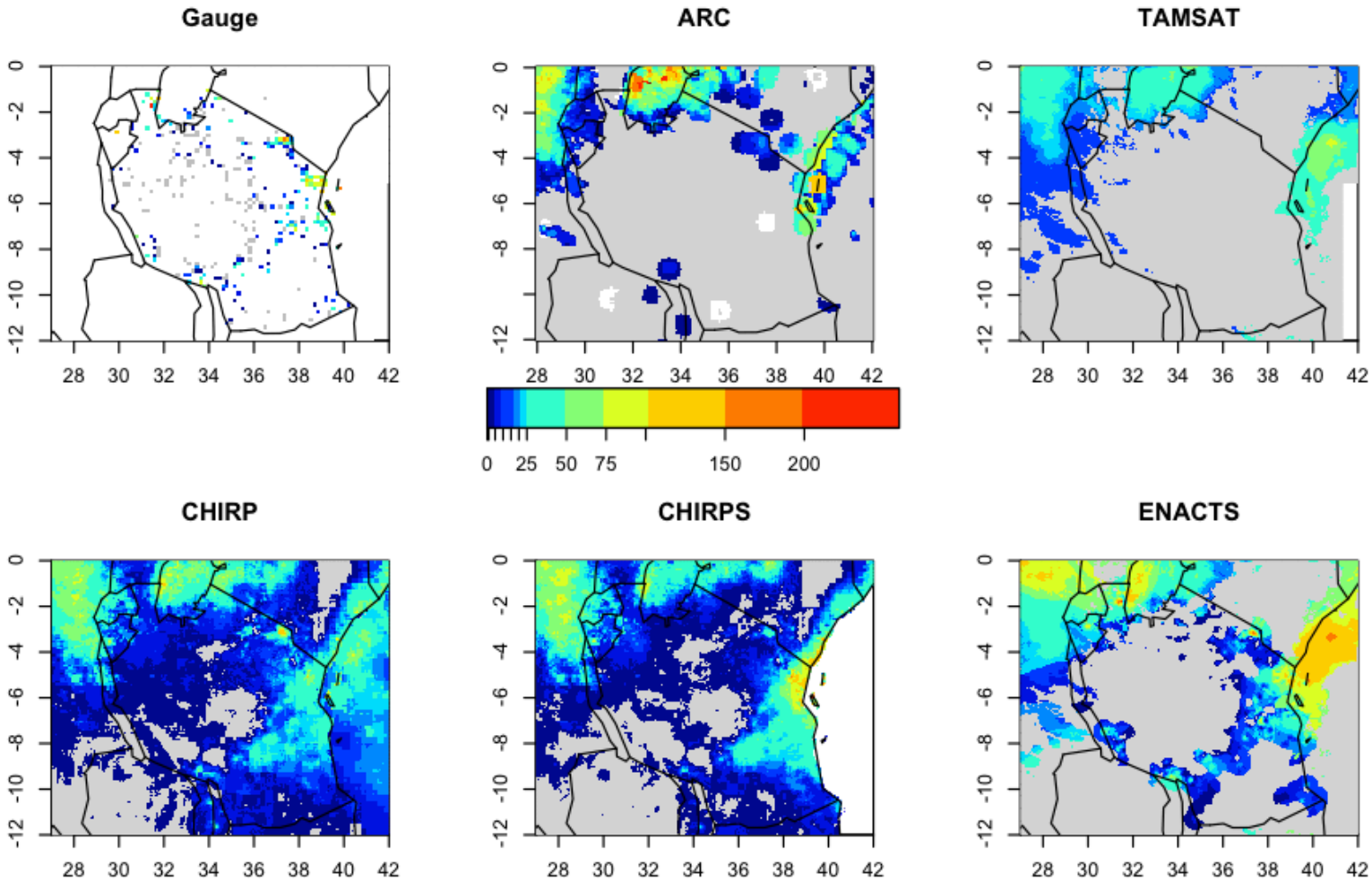
Tanzania

MAM				
	CC	Bias	Skill	MAE
ARC	0.43	0.60	0.03	32.6
TAMSAT	0.44	0.67	0.11	31.6
CHIRP	0.59	1.00	0.33	29.6
CHIRPS	0.57	0.79	0.28	28.2

DJF				
	CC	Bias	Skill	MAE
ARC	0.62	0.96	0.32	23.8
TAMSAT	0.53	0.81	0.22	25.3
CHIRP	0.62	1.00	0.37	24.1
CHIRPS	0.61	0.77	0.30	24.0

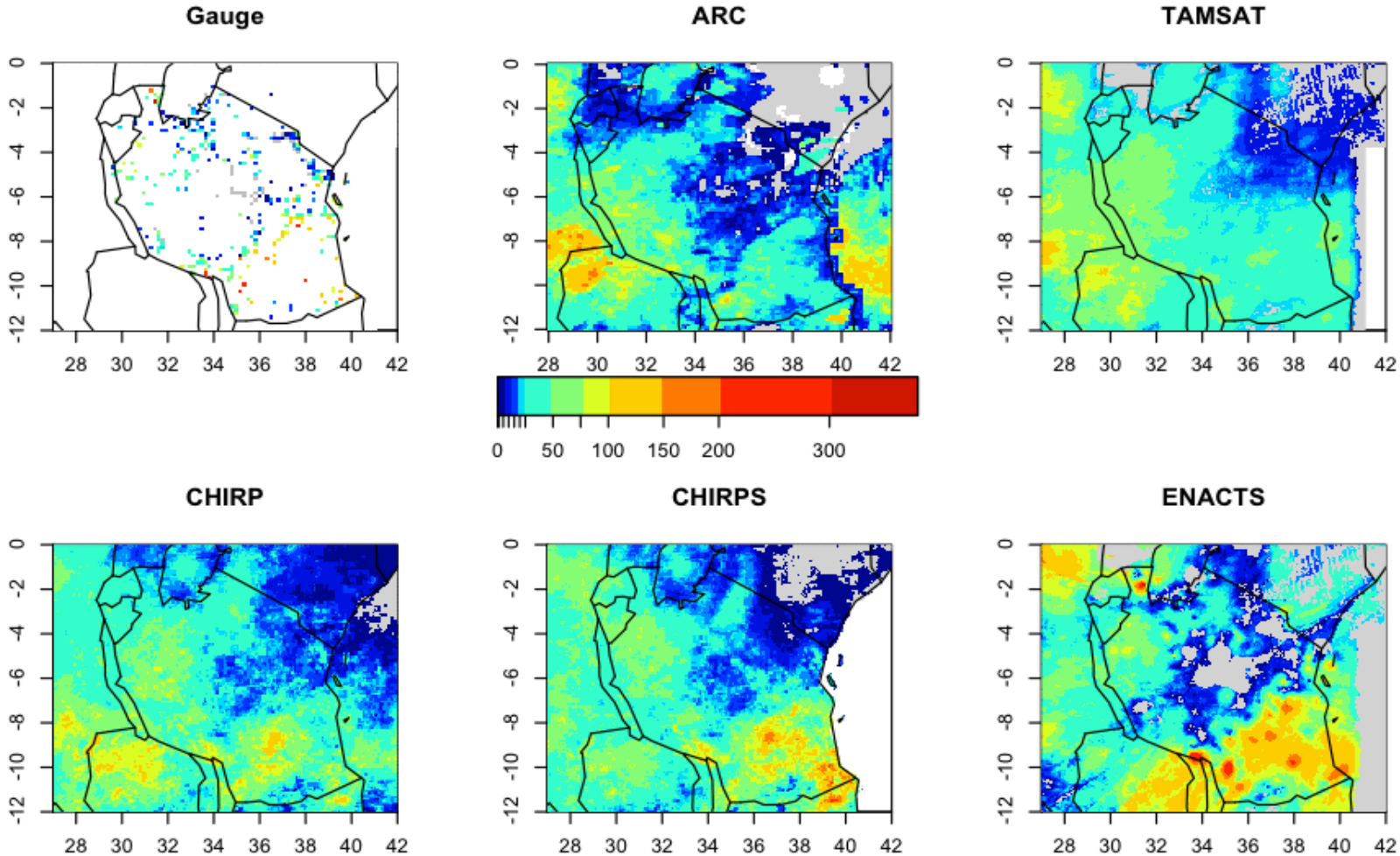
Results

Tanzania: Qualitative Comparisons with ENACTS data



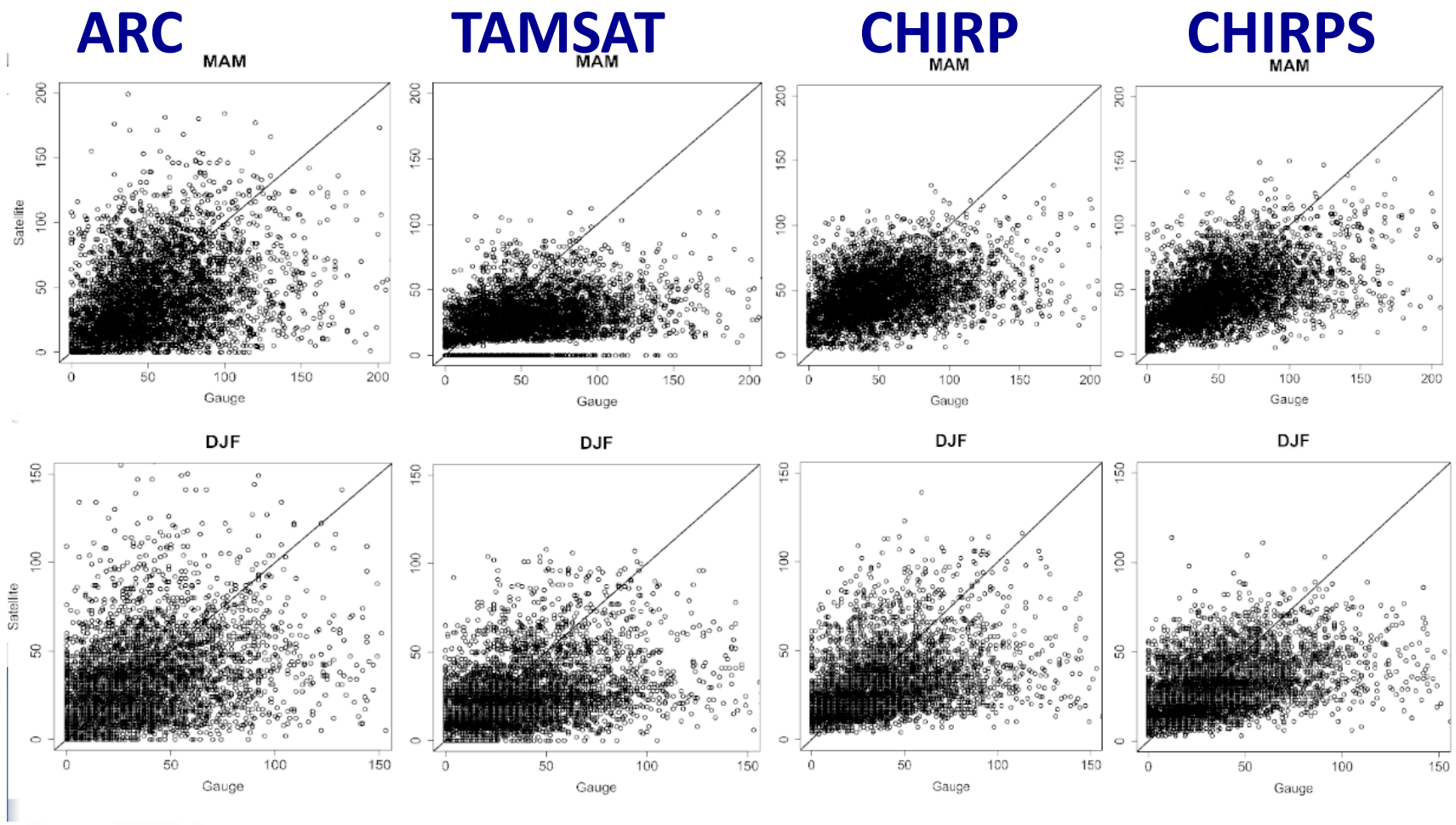
Results

Tanzania: Qualitative Comparisons with ENACTS data



Results

Rwanda



Results

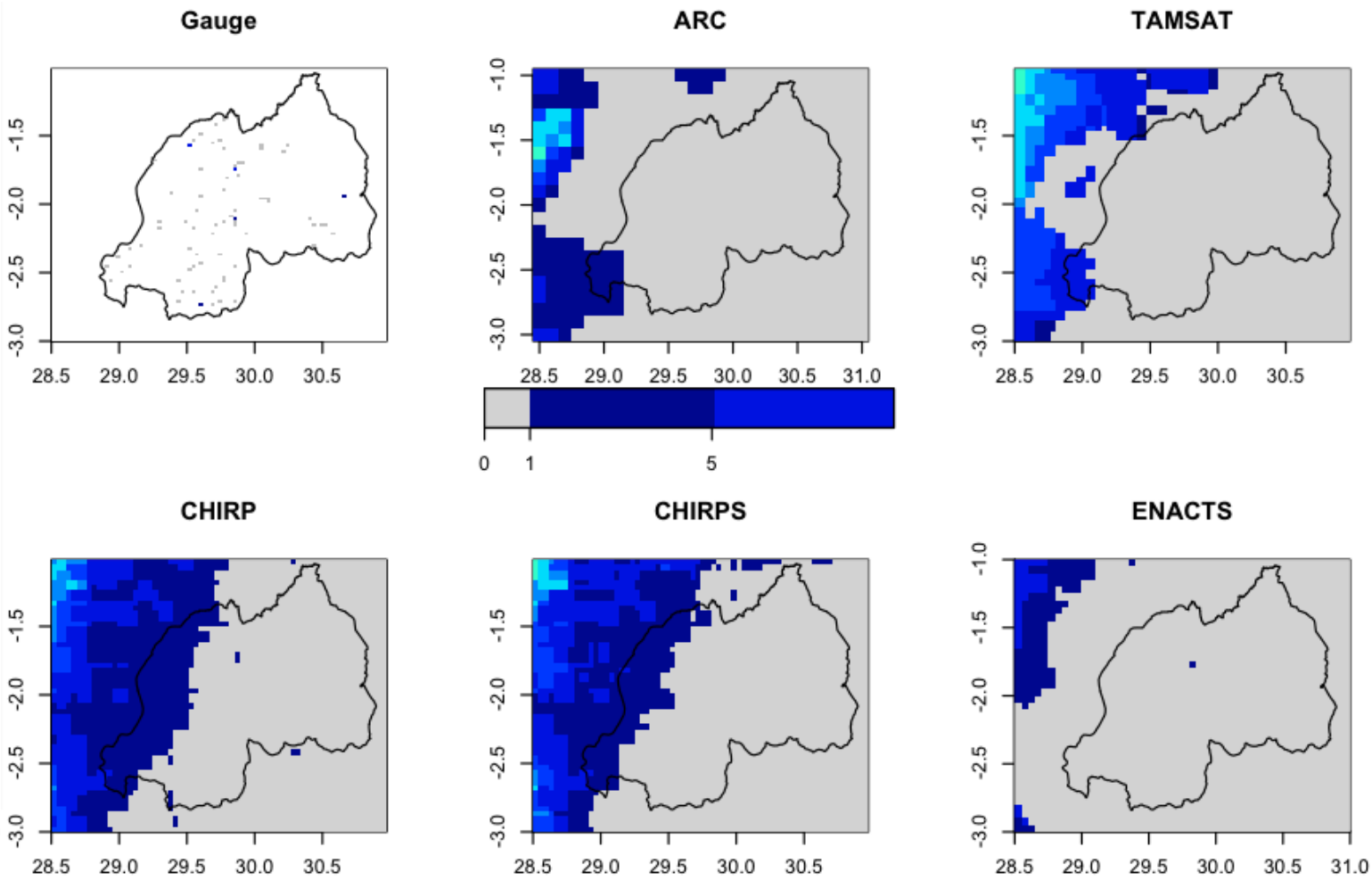
Rwanda

MAM				
	CC	Bias	Skill	MAE
ARC	0.30	0.77	-0.30	31.3
TAMSAT	0.30	0.52	-0.40	33.2
CHIRP	0.36	0.87	0.06	27.0
CHIRPS	0.46	0.86	0.15	25.4

DJF				
	CC	Bias	Skill	MAE
ARC	0.30	0.90	-0.20	24.0
TAMSAT	0.36	0.69	-0.10	22.8
CHIRP	0.37	0.82	0.02	21.4
CHIRPS	0.41	0.82	0.10	20.4

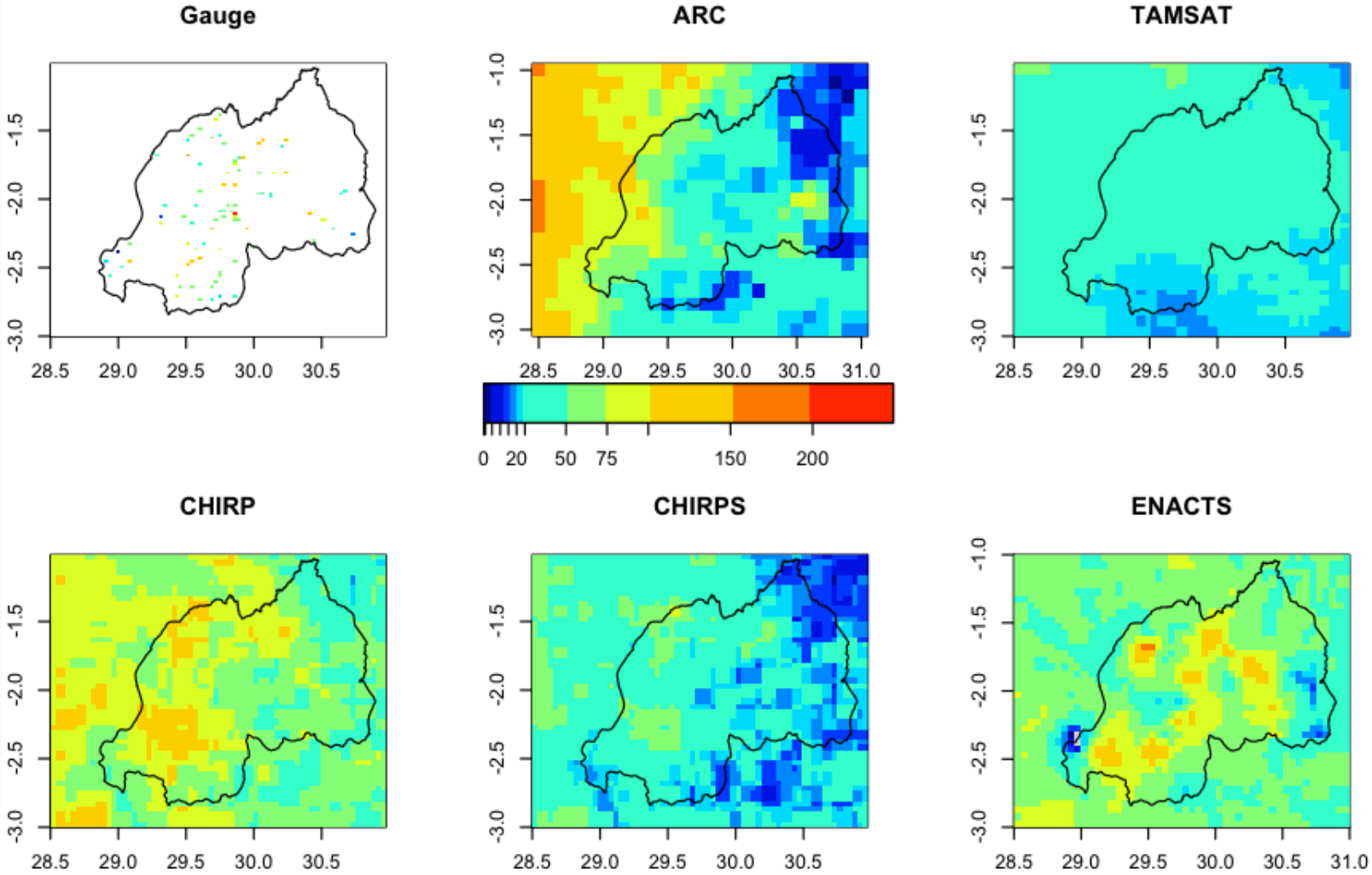
Result

Rwanda: Qualitative Comparisons with ENACTS data



Result

Rwanda: Qualitative Comparisons with ENACTS data



V. Summary

- **CHIRP better than ARC and TAMSAT in most cases**
- **The case of CHIRPS requires more investigation**
- **Qualitative comparisons shows that ENACTS is better than CHIRP/S mainly because it is incorporates more stations**