Thoughts on the Use of NN ADMs for Megha-Tropiques Mission

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Megha-Tropiques Mission
Indo-French Space Experiment

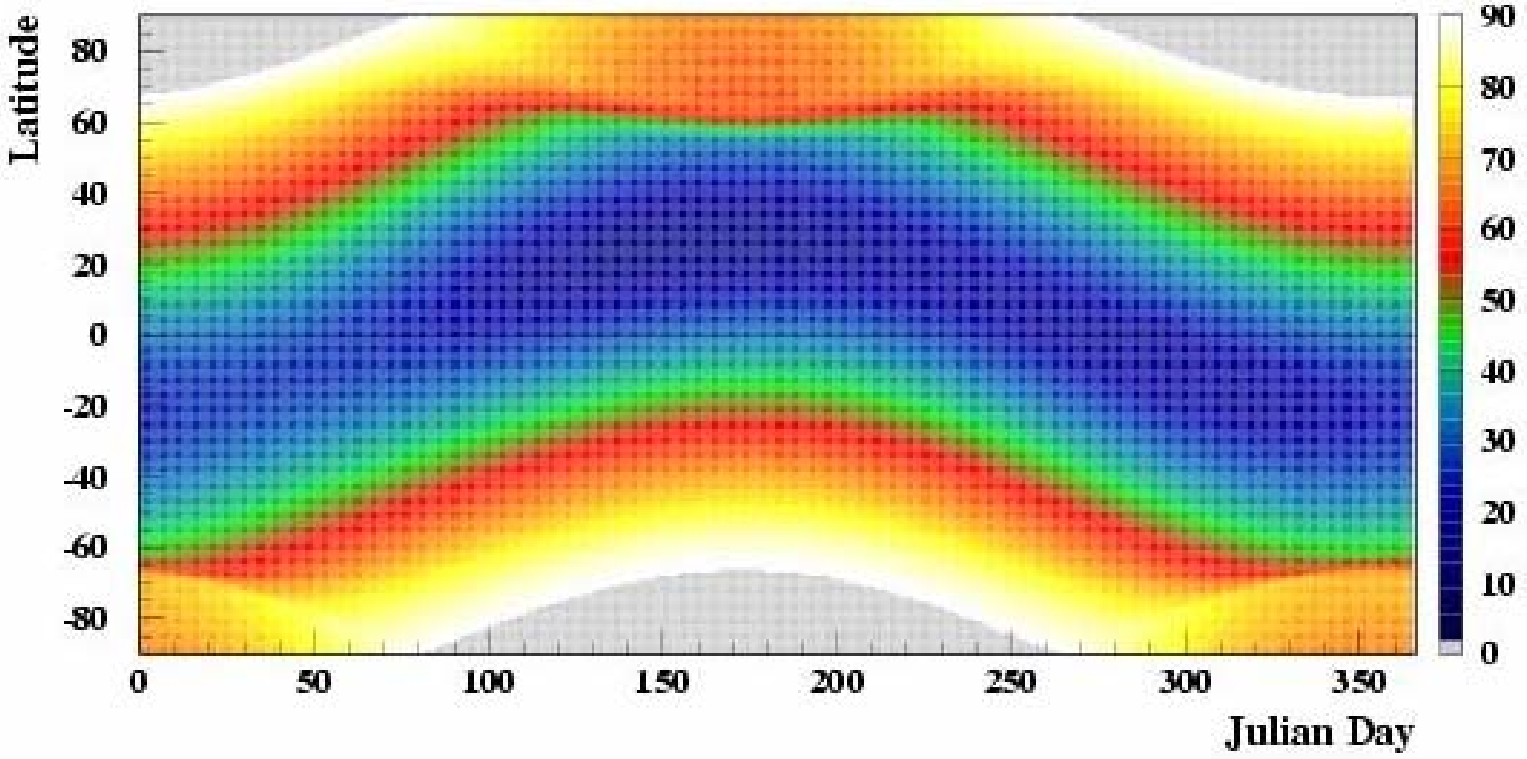
- **Orbit: 20° inclination, 885.6 km height.**
- **Measurements from 22° S to 22° N.**
- **GEO VIS-IR based scene ID (SEVIRI).**
- **ScaRab: cross-track scanning, 40 km resolution at nadir, SW (0.2 - 0.4 μm) and total (0.2 - 200 μm) channels.**
- **Launch 2008 – 2009, 3 years mission.**

NN Development Steps

- Defining and building NN training sets using CERES SSF data product (redused resolution CERES/TRMM ADMs ?)
- NN training and validation.
- Final NN can be programmed in as stand-alone subroutine: very short and fast code, highly non-linear functions.
- Time needed: about 6 months.

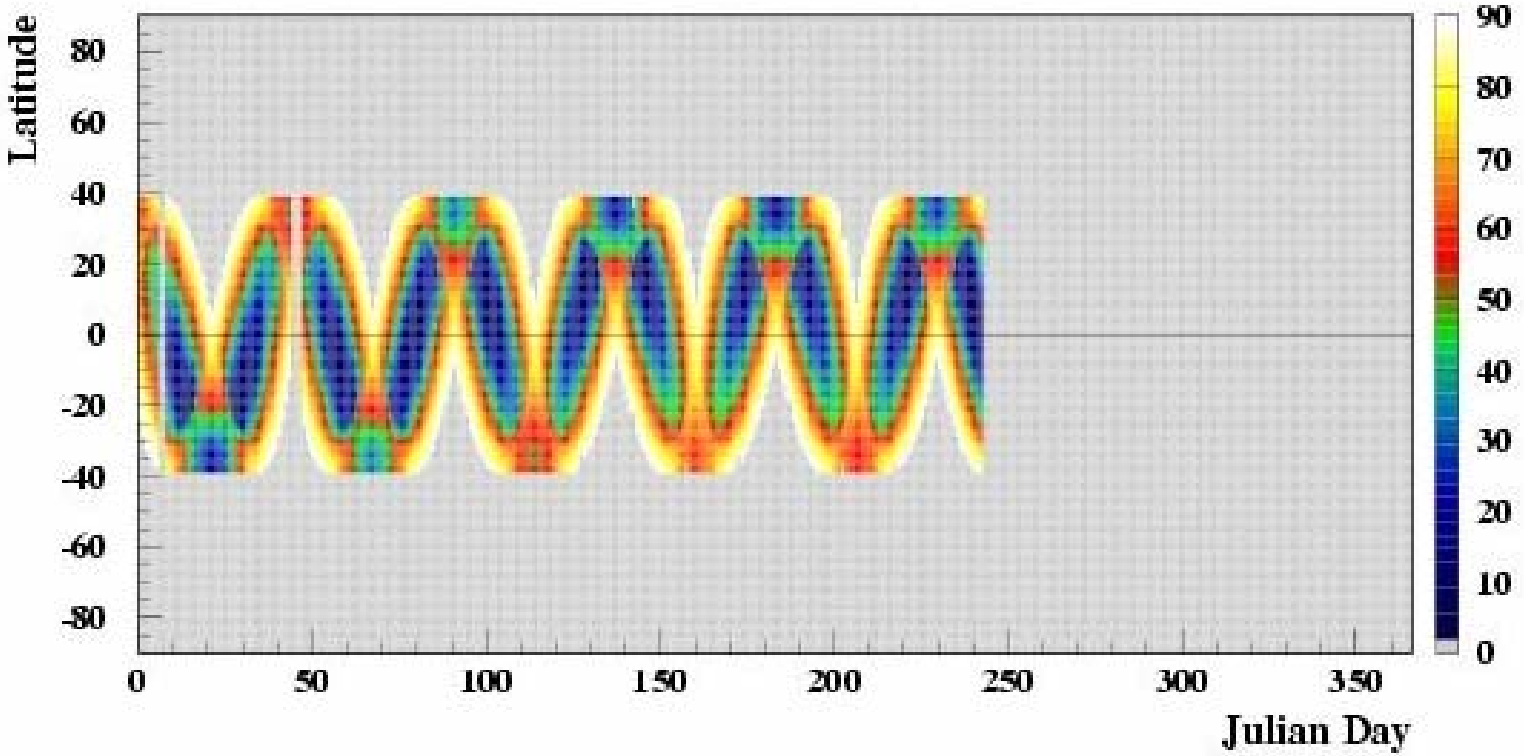
CERES/Terra SZA Sampling

Cross-Track, 2004.



CERES/TRMM SZA Sampling

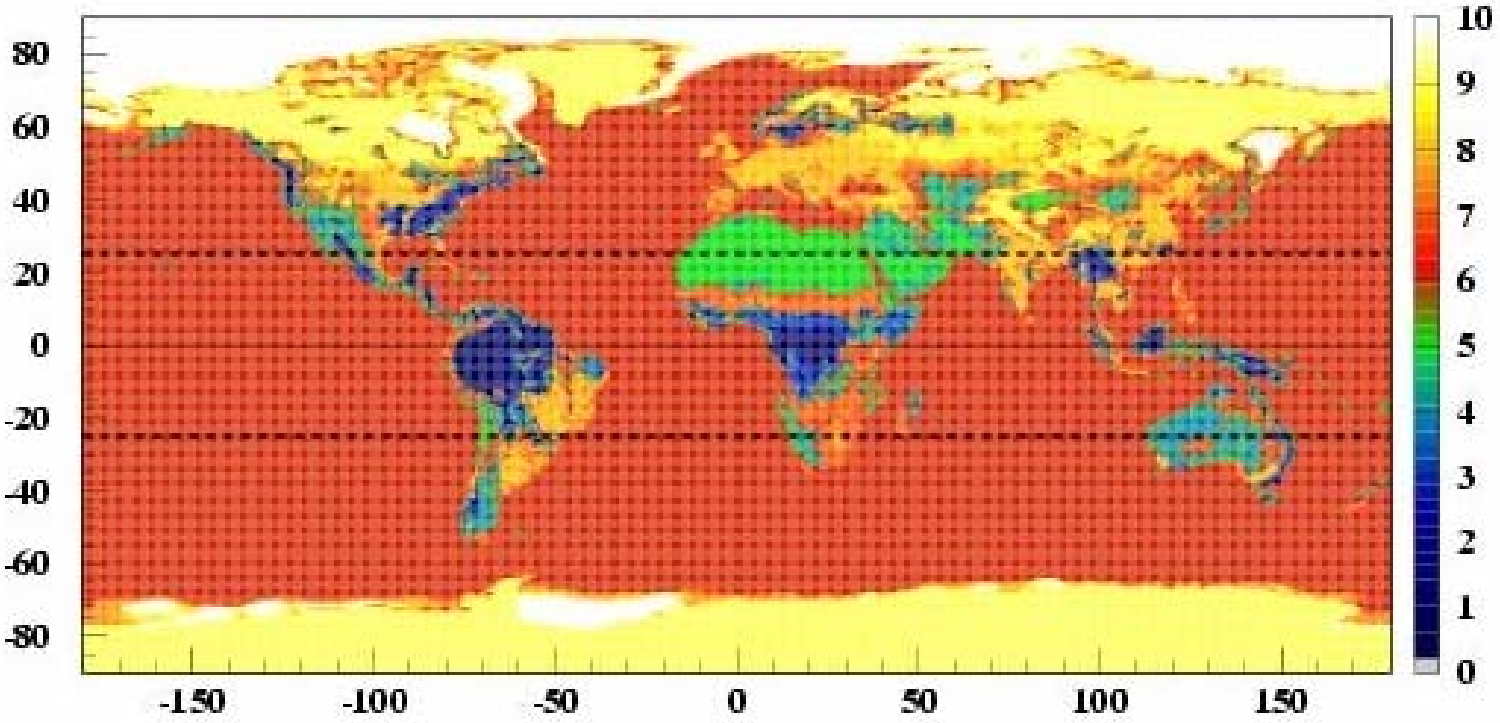
8 months, 1998.



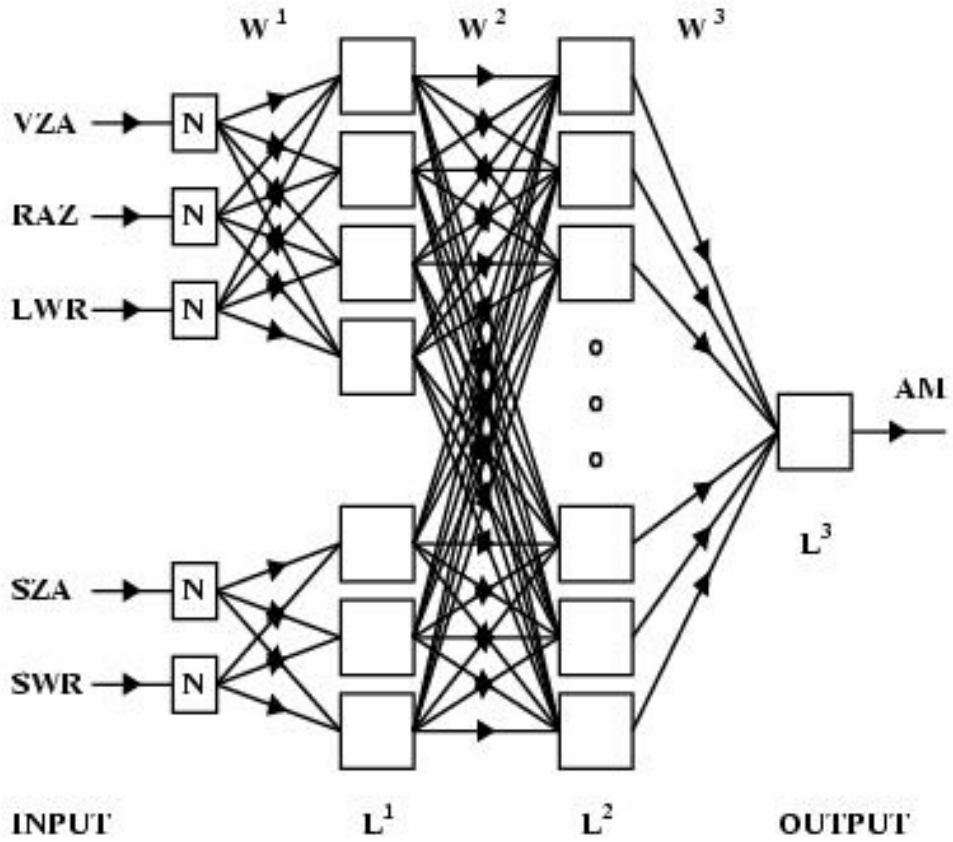
NN Scene Types

Index	NN Scene Type	IGBP Types
1	Evergreen Forests	1, 2
2	Deciduous Forests	3, 4, 5
3	Woody Savannas & Closed Shrubs	6, 8
4	Open Shrubs & *Tundra* (Dark Desert)	7, *18*
5	Bare Soil and Rocks (Bright Desert)	16
6	Water Bodies	17
7	Grasslands, Savannas, Wetlands	9, 10, 11
8	Croplands	12, 13, 14
9	Fresh and *Permanent* Snow & Ice	15, 19
10	Sea Ice	20

NN Scene Type (Spring 2002)



Terra SW NN Lay-out:
5IN-7TS-11TS-1L



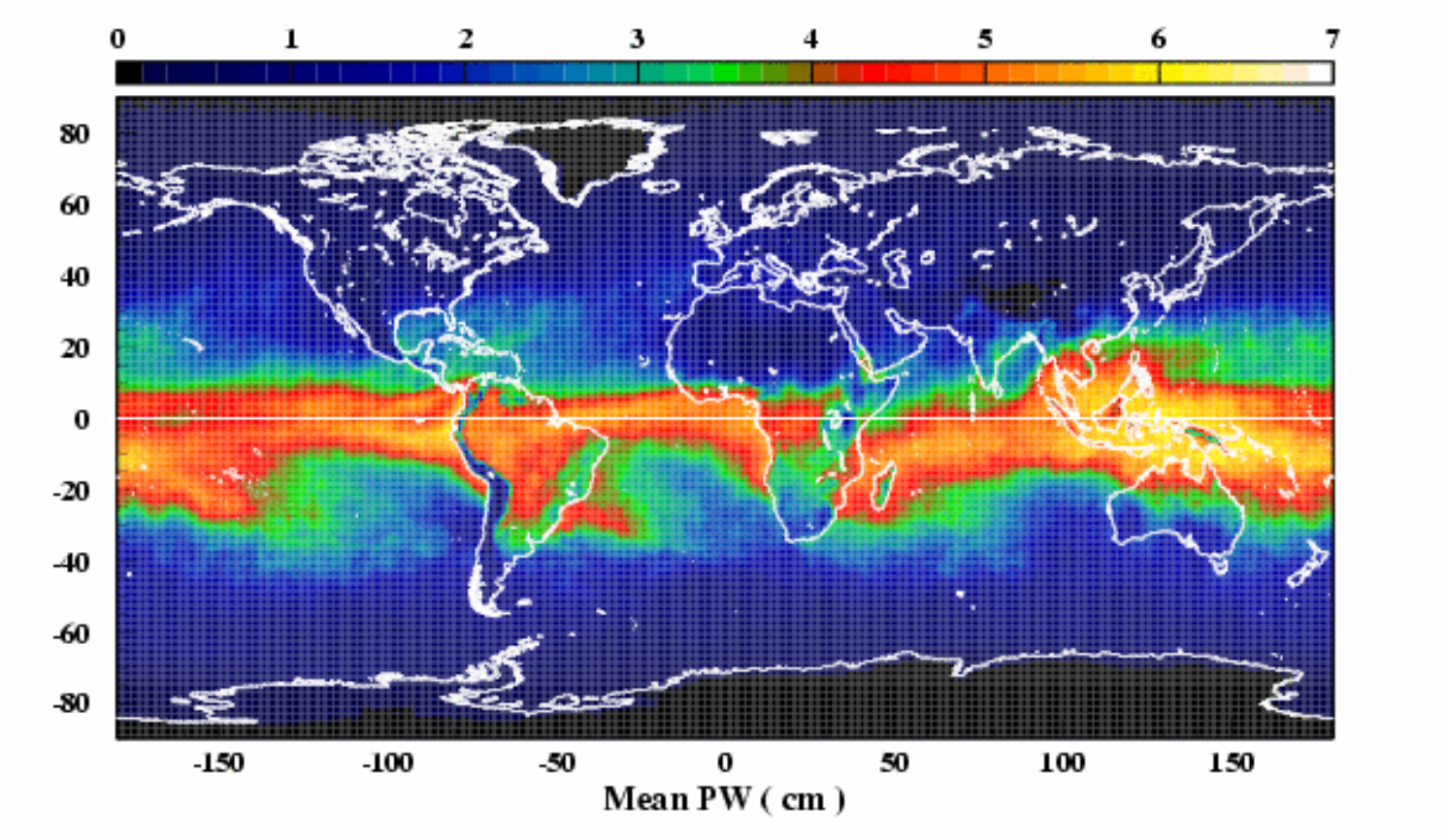
NN Training Sets

	Variable SW	N Bins SW	Bin Width	Variable LW	N Bins LW	Bin Width
1	VZA	7	10	VZA	7	10
2	RAZ	9	20	RAZ	6	30
3	LWR	15	10	SWR *(SZA)*	20 *(9)*	15 *(10)*
4	SZA	9	10	PW	10	1
5	SWR	30	10	LWR	30	5

?	PW	For Ocean

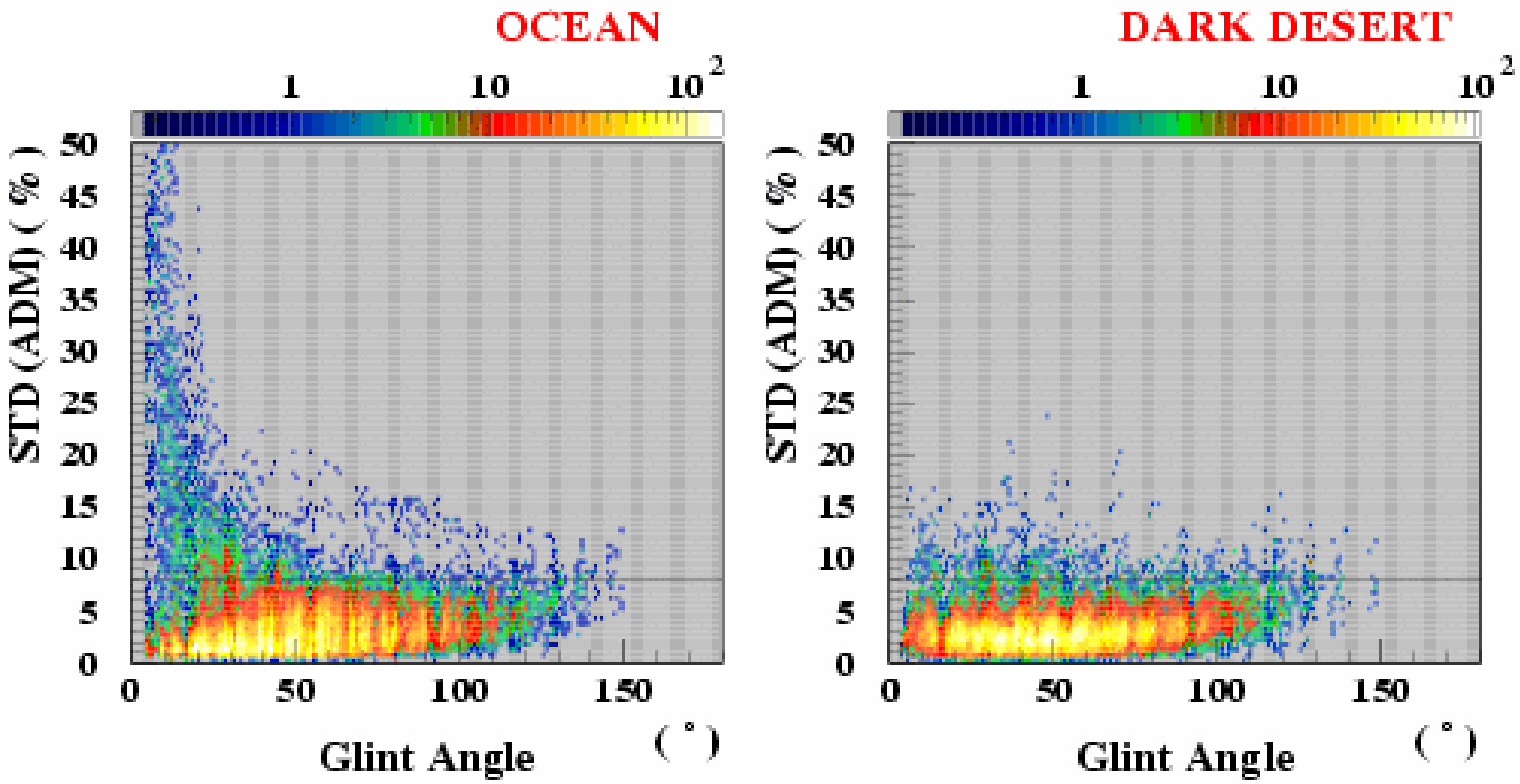
March, 2001

Precipitable Water

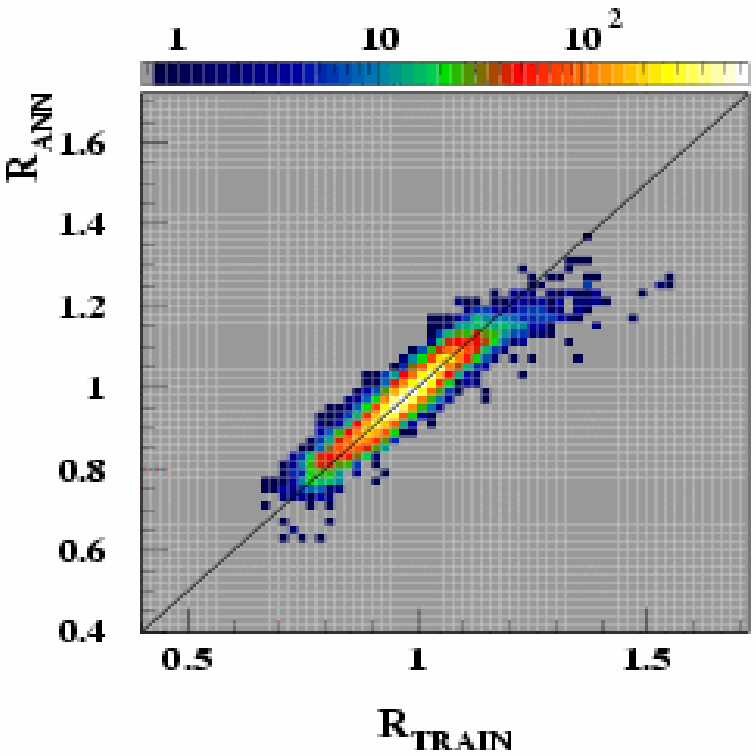


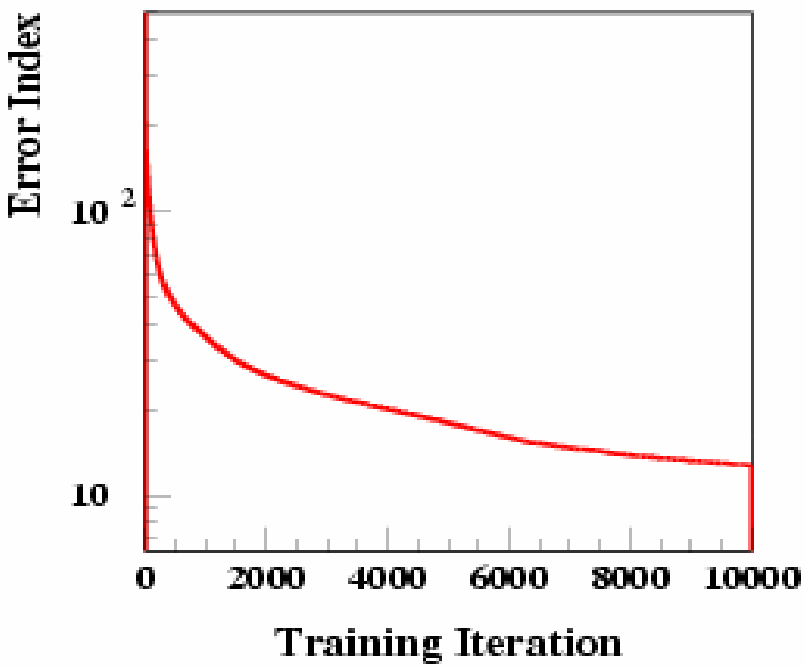
ADM Noise-Based Rejection

Shortwave



SW NN Training: Bright Desert

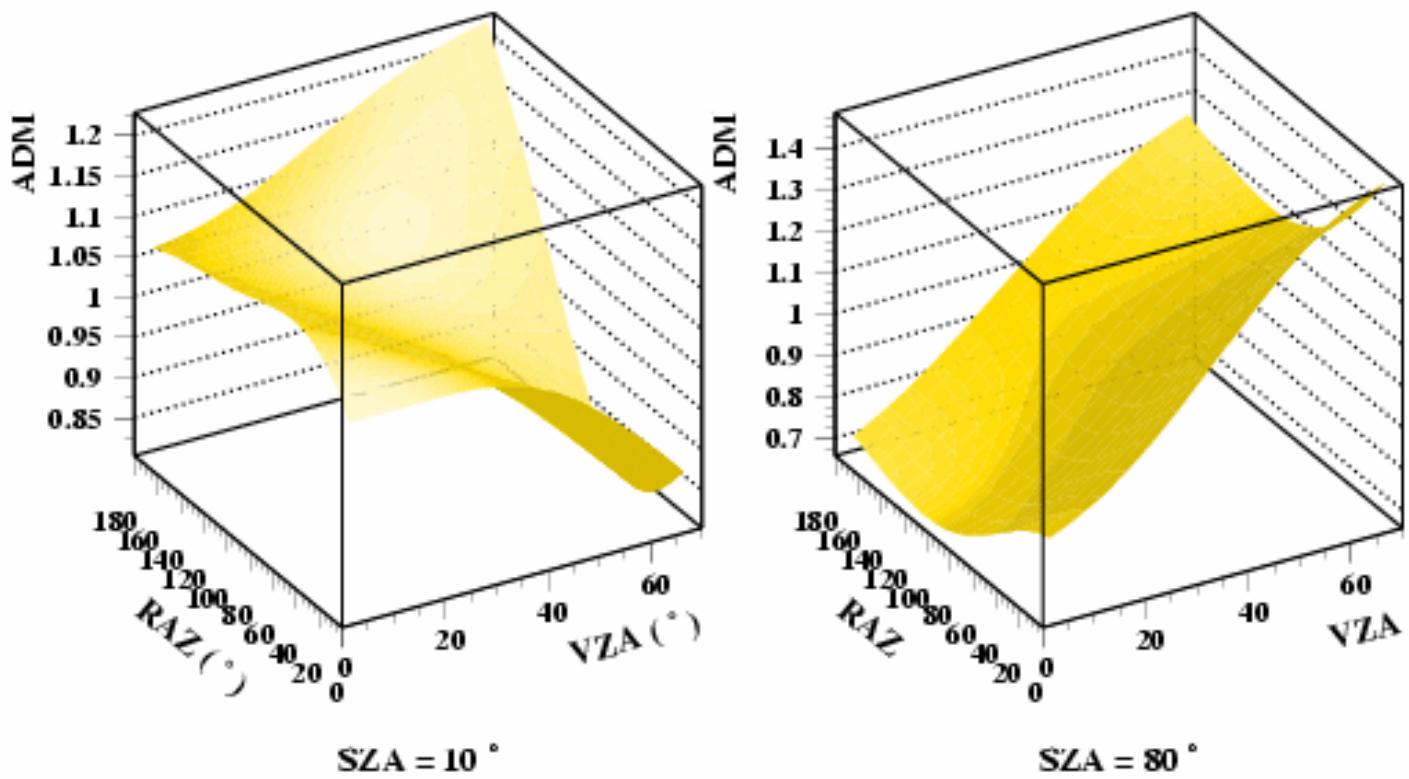




NN Scene Types & Training Errors
DAY-TIME

Index	ANN Scene	IGBP Types	SW Bias (%)	SW STD (%)	LW Bias (%)	LW STD (%)
1	EF	1, 2	0.110	3.419	0.011	0.984
2	DF	3, 4, 5	0.146	3.872	0.007	0.812
3	WS	6, 8	0.128	3.572	0.011	0.909
4	DD	7, 18	0.106	3.499	0.006	0.719
5	BD	16	0.084	2.965	0.008	0.667
6	WB	17	0.129	4.062	0.010	0.913
7	GR	9, 10, 11	0.120	3.481	0.010	0.901
8	CC	12, 13, 14	0.120	3.405	0.009	0.852
9	SN	15, 19	0.118	3.657	0.013	1.022
10	SI	20	0.122	3.826	0.005	0.620

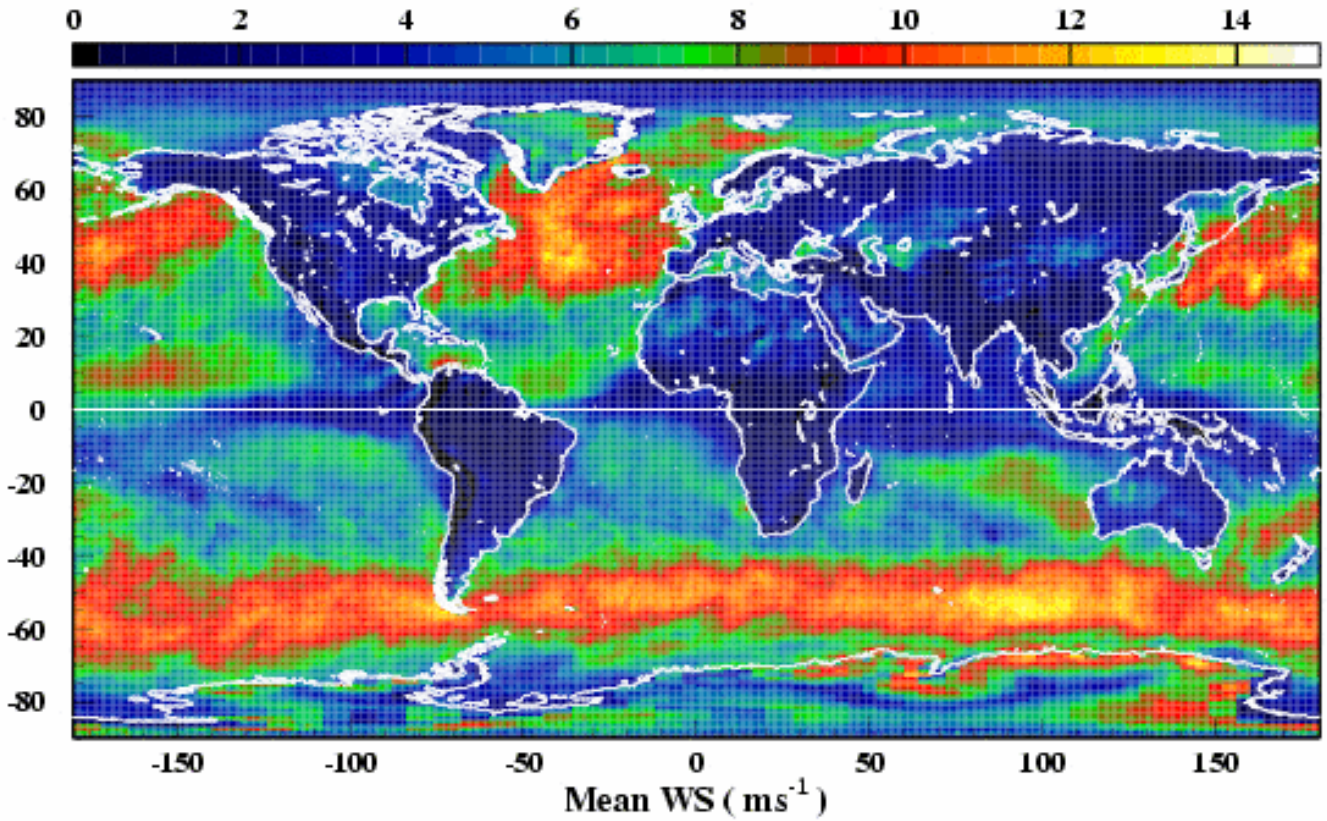
NN ADM Function:
Dark Desert



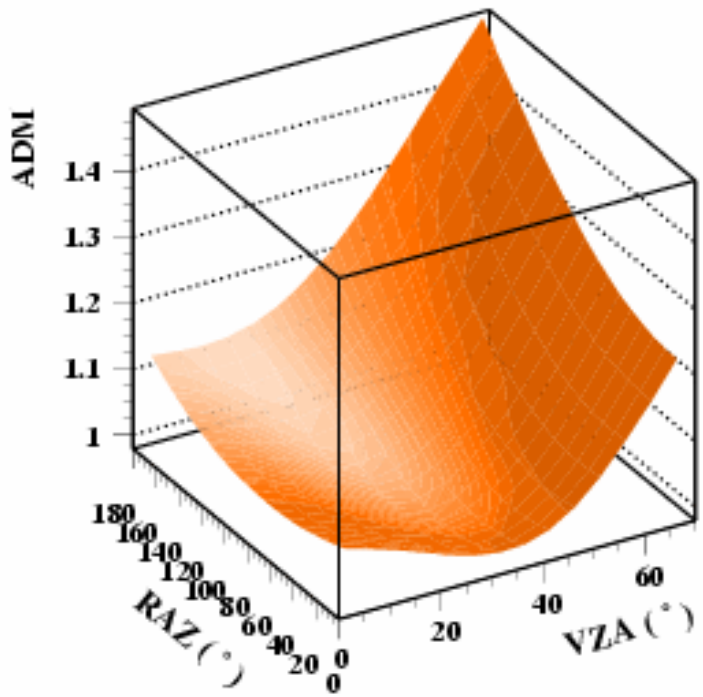
ADDITIONAL SLIDES

March, 2001

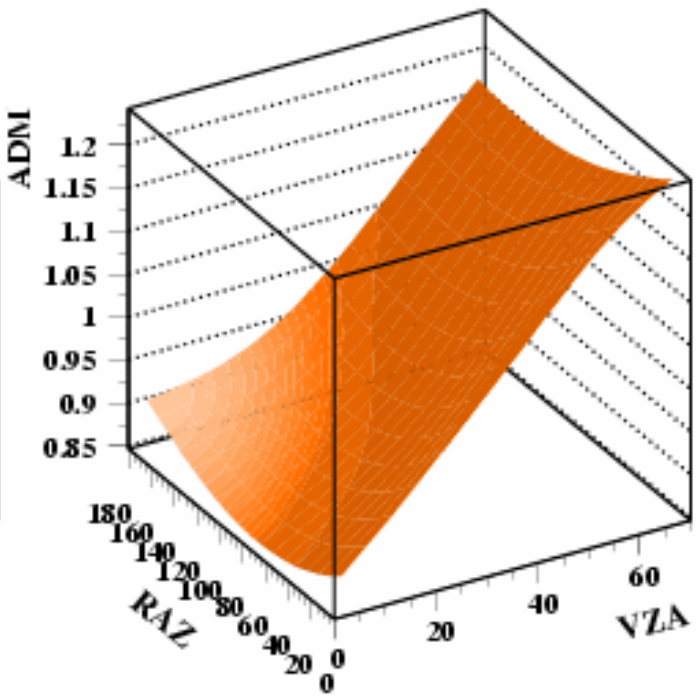
Wind Speed



NN ADM Function:
Water Bodies



SZA = 10 °



SZA = 80 °