

RESULTS

➤ The K_{PAR} and AOT parameters relation at the specified wavelengths were plotted in graphs for each station, as showed in Figure 3, 4, 5 and 6. Every dot corresponds to a specific day.

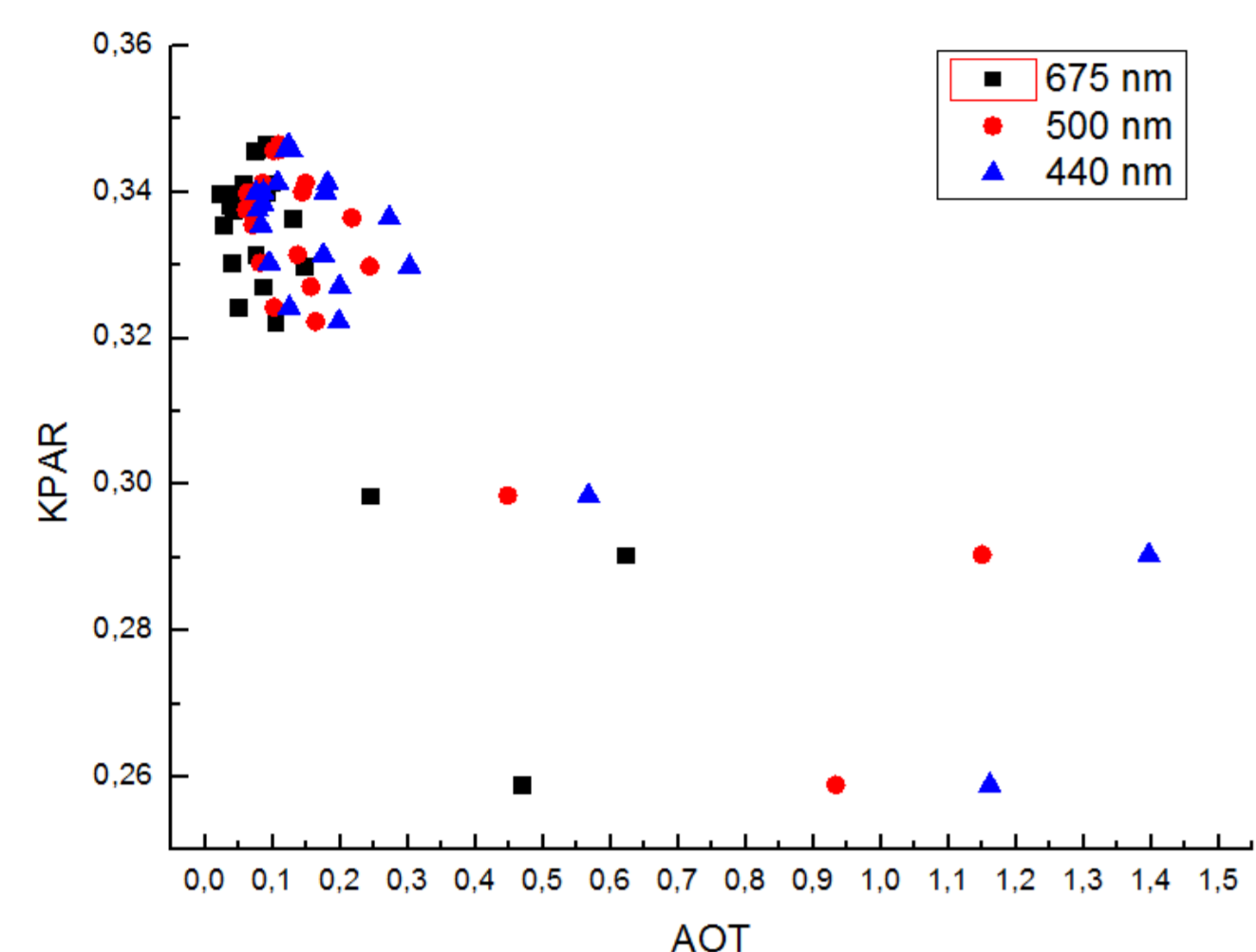


Figure 3 – Scatter plot relating the K_{PAR} and AOT parameters for the Alta Floresta station.

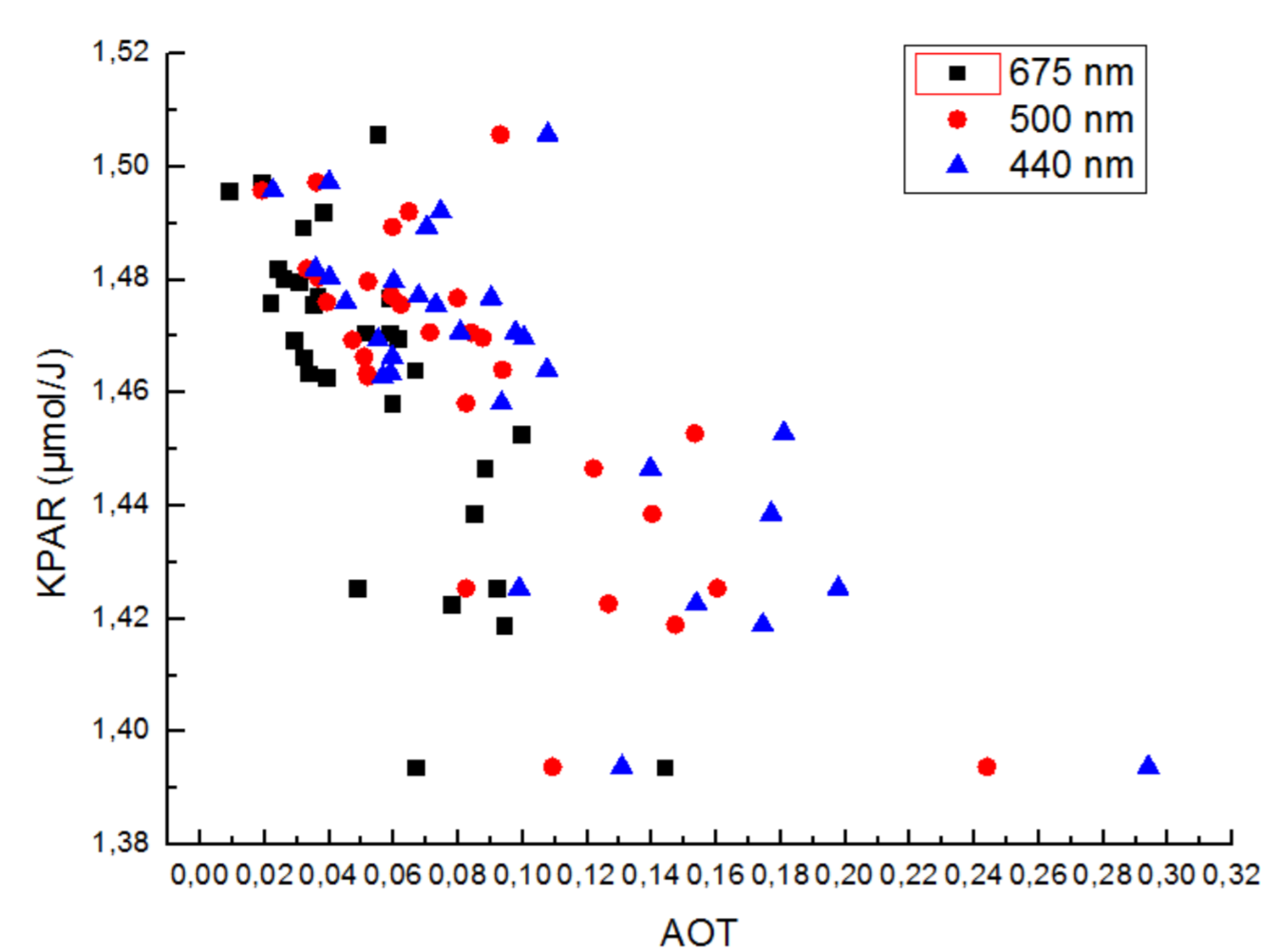


Figure 4 – Scatter plot relating the K_{PAR} and AOT parameters for the Campo Grande station.

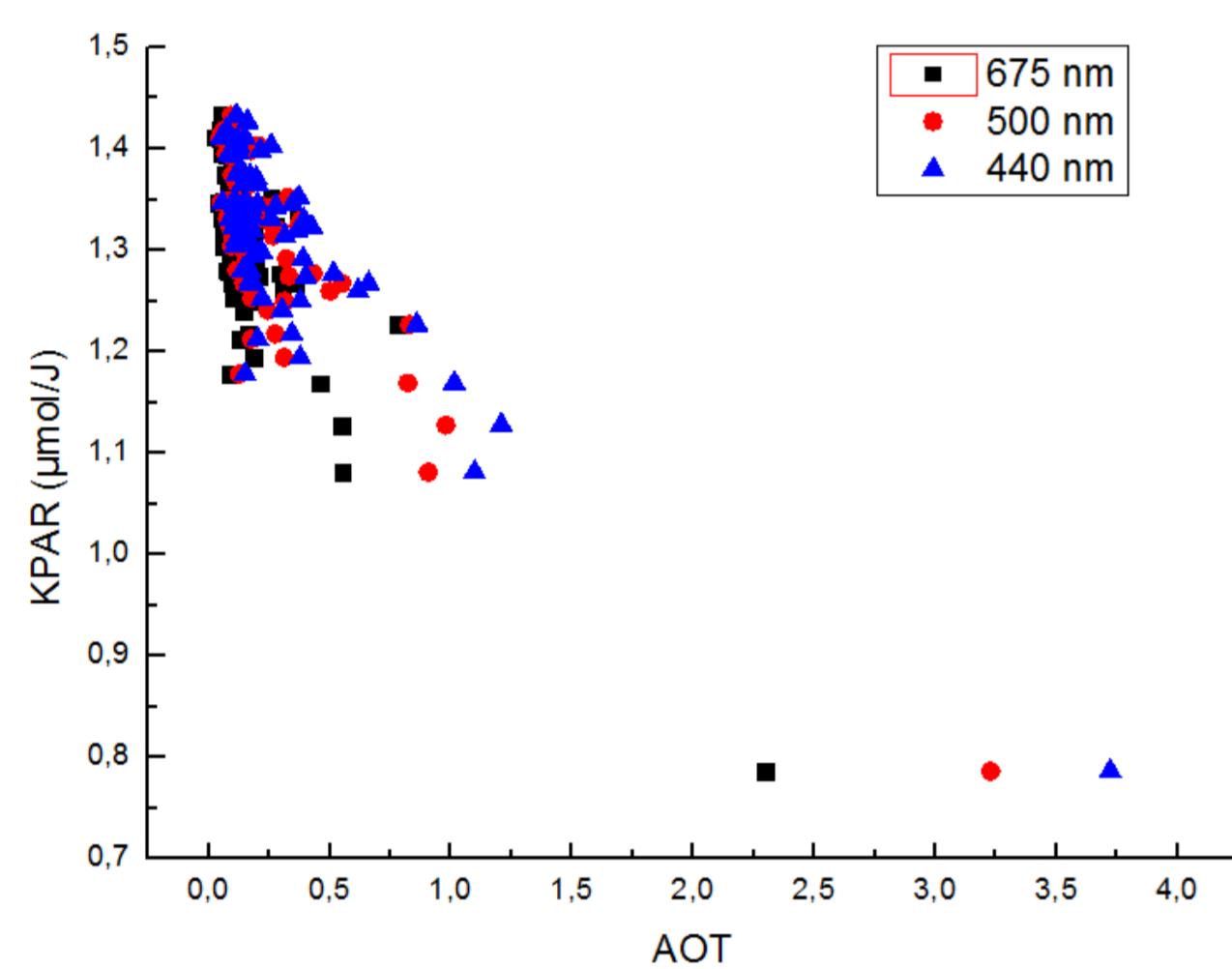


Figure 5 – Scatter plot relating the K_{PAR} and AOT parameters for the Cuiabá station.

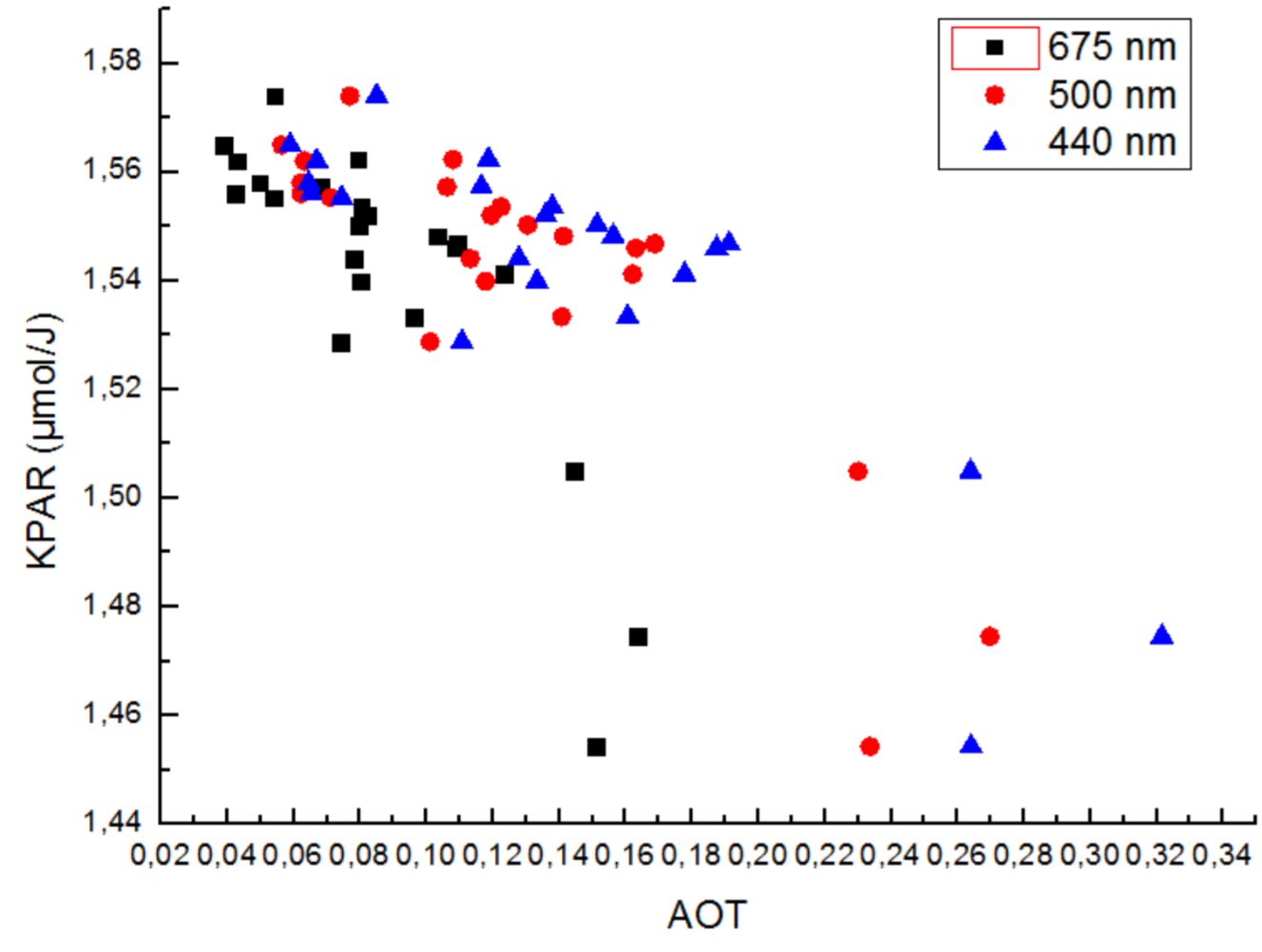


Figure 6 – Scatter plot relating the K_{PAR} and AOT parameters for the Petrolina station.

➤ For each empirical model developed the statistical deviations RMSE (Root Mean Square Error) and MBE (Mean Bias Error) calculated are presented at the Tables 2, 3, 4 and 5.

Table 2 – Statistical deviations MBE and RMSE for the Alta Floresta - MT.

		Linear		Polynomial 2°		Exponential	
		MBE	RMSE	BEM	RMSE	MBE	RMSE
Alta Floresta (1999-2003)	675 nm	0,72		0,75		0,73	
		-1,09	5,00	-1,01	4,99	-1,10	5,00
	500 nm	0,77		0,82		0,80	
		1,96	2,94	4,08	11,54	2,61	5,78
	440 nm	0,78		0,83		0,81	
		1,85	2,81	3,85	10,77	2,52	5,65

Table 3 – Statistical deviations MBE and RMSE for the Campo Grande - MS.

		Linear		Polynomial 2°		Exponential	
		MBE	RMSE	BEM	RMSE	MBE	RMSE
Campo Grande (2008)	675 nm	0,57		0,57		0,57	
		0,72	1,61	0,72	1,61	0,70	1,61
	500 nm	0,59		0,59		0,59	
		0,67	1,65	0,65	1,65	0,65	1,65
	440 nm	0,60		0,60		0,60	
		0,67	1,66	0,64	1,67	0,64	1,66

Table 4 – Statistical deviations MBE and RMSE for the Cuiabá - MT.

		Linear		polynomial 2°		Exponential	
		MBE	RMSE	BEM	RMSE	BEM	RMSE
Cuaibá (2006-2008)	675 nm	0,63		0,65		0,65	
		-0,07	4,66	-0,33	4,66	-0,33	4,68
	500 nm	0,68		0,70		0,70	
		0,08	4,30	-0,16	4,30	-0,14	4,31
	440 nm	0,69		0,71		0,71	
		0,14	4,25	-0,06	4,24	-0,05	4,25

Table 5 – Statistical deviations MBE and RMSE for the Petrolina - PE.

		Linear		polynomial 2°		Exponential	
		MBE	RMSE	BEM	RMSE	BEM	RMSE
Petrolina (2005-2007)	675 nm	0,69		0,80		0,69	
		-0,03	0,95	-0,80	1,73	-0,02	0,94
	500 nm	0,72		0,80		0,72	
		-0,09	0,78	-0,60	1,39	-0,09	0,78
	440 nm	0,72		0,78		0,72	
		-0,10	0,72	-0,54	1,26	-0,10	0,72

➤ The empirical models estimated and measured K_{PAR} values are plotted for the three SONDA stations: Campo Grande, Cuiabá and Petrolina - Figures: 7, 8 and 9.

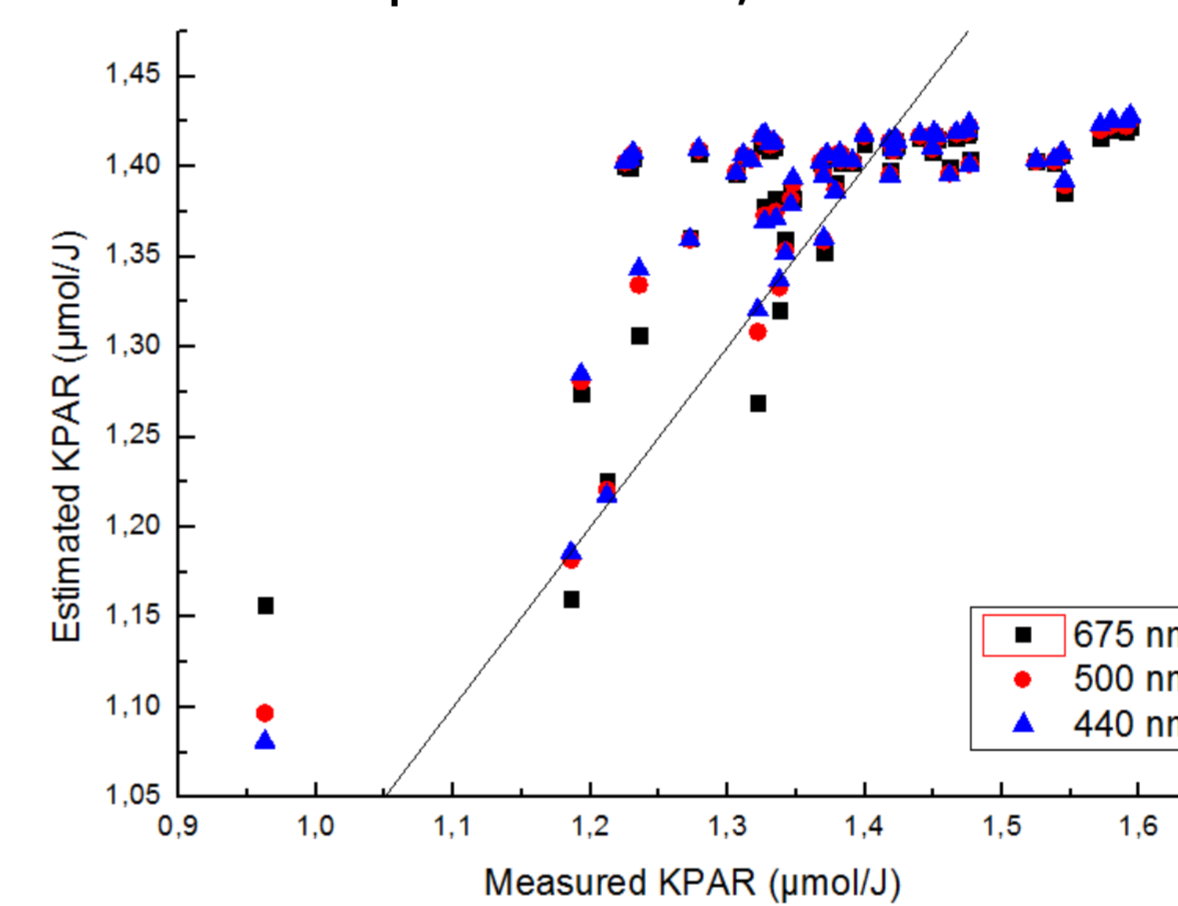


Figure 7 – Scatter plot relating the K_{PAR} estimated **Linear** model and the measured values for the three SONDA stations.

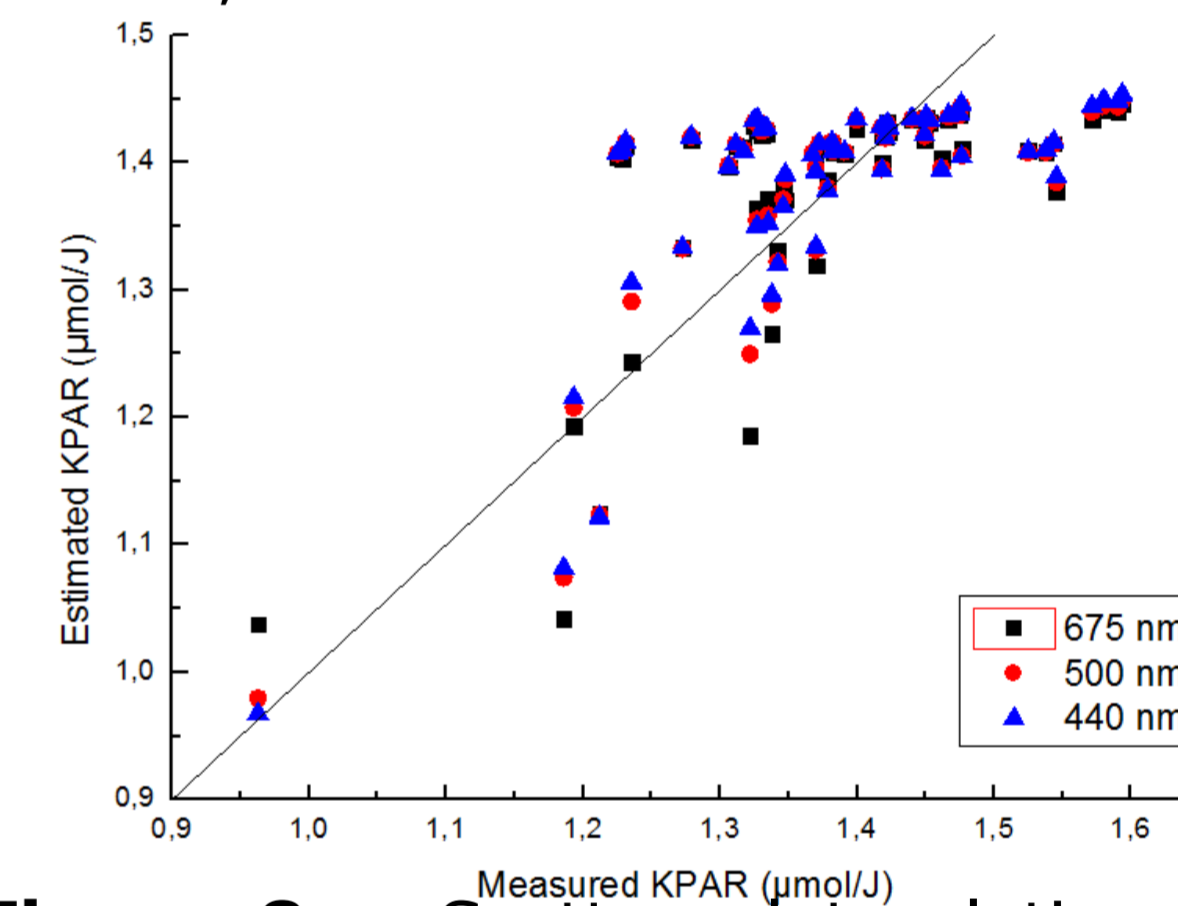


Figure 8 – Scatter plot relating the K_{PAR} estimated **Polynomial** model and the measured values for the three SONDA stations.

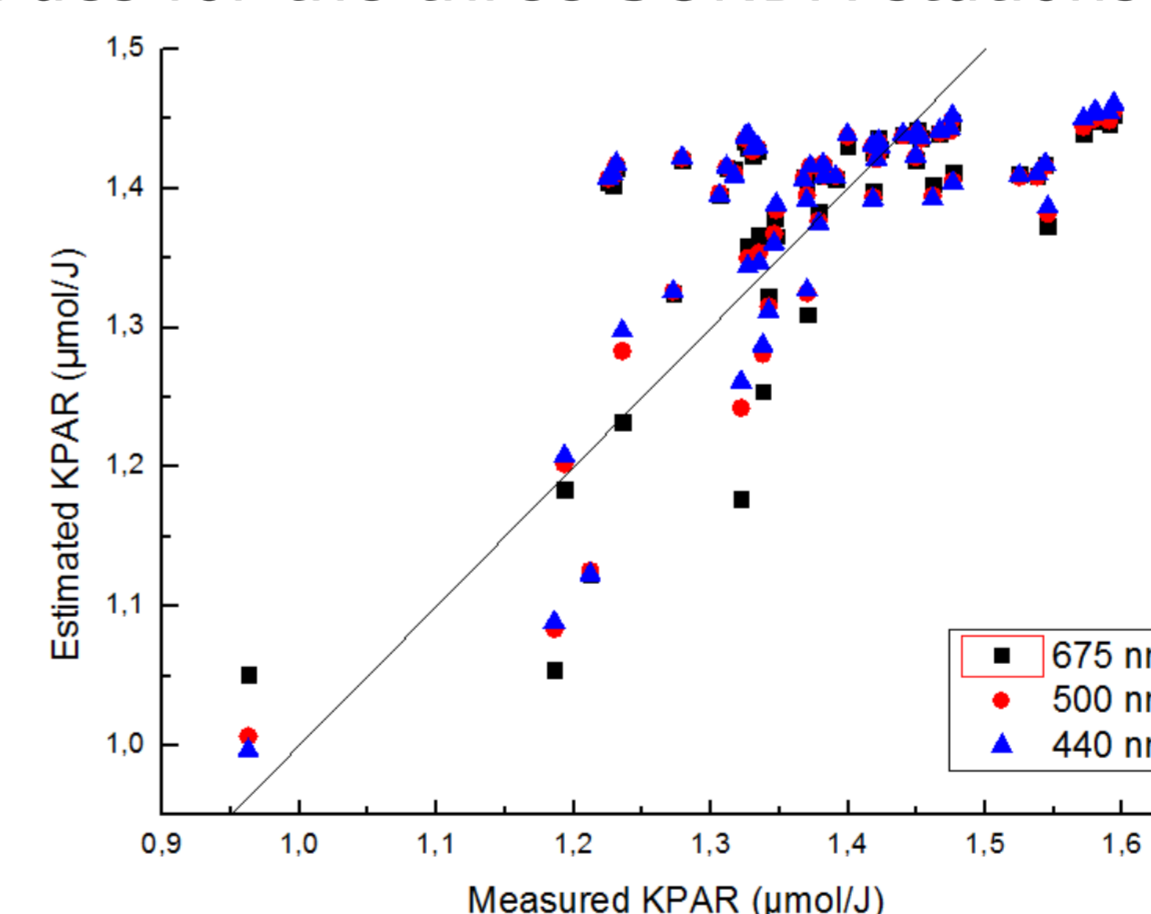


Figure 9 – Scatter plot relating the K_{PAR} estimated **Exponential** model and the measured values for the three SONDA stations.

CONCLUSIONS

➤ In general, all models showed satisfactory performance, as indicated by the low statistical deviations. The **polynomial** models have presented **higher** deviations from the others used regressions models.

➤ The **polynomial** models achieve RMSE values of **11.54% for Alta Floresta** in the wavelength of 500 nm, while the **exponential** and **linear** models showed, respectively, **2.94 % and 5.78%**. The statistical models showed lower deviations at Campo Grande and Petrolina with an RMSE values around 1.5%.

➤ For the future, it is intend to perform further analysis with larger data numbers aiming better performance for empirical models, using also the Reference Station SONDA – SMS's data, at the Southern Space Observatory - OES/CRS/CCR/INPE - MCT, (29°26' S 53°48' W), São Martinho da Serra, RS, for an extensive Brazilian territory investigation.

REFERENCES

- SONDA, National Organization System Of Environment Data. Available at <http://www.cptec.inpe.br/sonda/>;
- AERONET, Aerosol Robotic Network. National Aeronautics and Space Administration. Goddard Space Flight Center. Available at <http://aeronet.gsfc.nasa.gov/>;

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