Results from applying the Laslett, Polacheck and Eveson (LEP) method to the data agreed on at the IOTC Working Party on Tagging Data Analysis (WPTDA), 30 June – 4 July 2008

Parameter estimates:

Species	Model	μ_∞	σ_∞	k_1	k_2	α	β	$\mu_{\log A}$	$\sigma_{\log A}$	σ
YFT[1]	VB log k	117.659	9.687	0.236	3.367	3.491	8.512	1.020	0.145	3.043
BET	VB log k	167.970	3.647	0.064	0.375	5.762	3.041	1.659	0.078	2.523
SKP	VB	65.833	4.405	0.498	—	—	—	1.033	0.096	1.688

Refer to the WPTDA report by Eveson and Million and Laslett et al. (2002)[2] for information about the VB log k model and LEP estimation method. Recall *A* (the age at tagging relative to a_0) is assumed to follow a lognormal distribution with mean and standard deviation on the log scale of $\mu_{\log A}$ and $\sigma_{\log A}$. Also, individual variability in growth is allowed for by modelling L_∞ as a random variable; specifically, it is assumed to be random normal with mean μ_∞ and standard deviation σ_∞. Finally, measurement error is allowed for through an additive random normal variable with mean 0 and standard deviation σ.

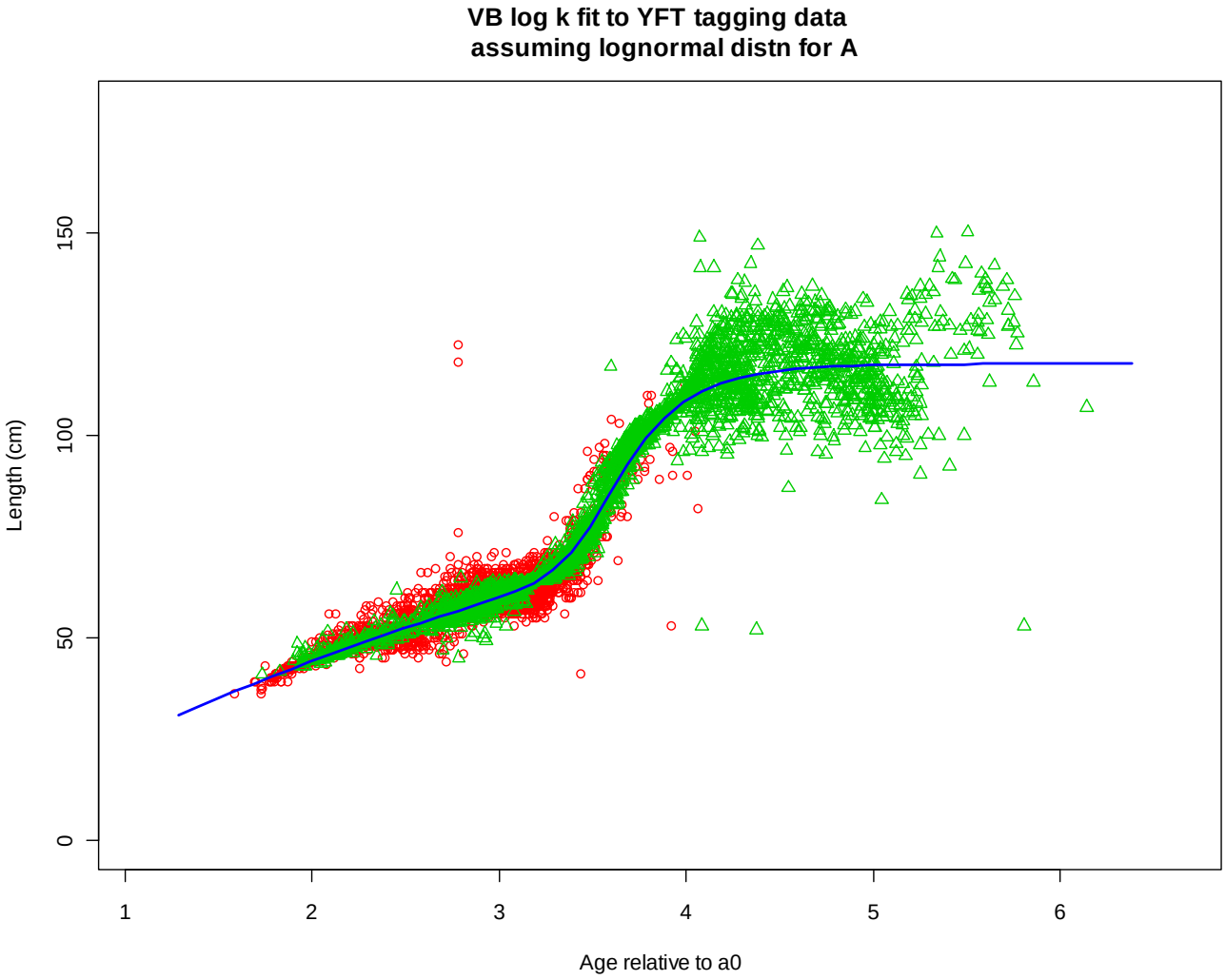
In the diagnostic plots that follow, a realized value of A is required for each fish. The approximately conditionally unbiased estimator $\tilde{A}_f$ proposed in Laslett et al. (2004)[3] is used because, as described in this paper, it is preferred to the more standard minimum variance estimator for graphical purposes. (Note that in the report submitted to the WPTDA, the minimum variance estimator was used in the plots shown.)

[1] The minimization software used to fit the model (nlminb in S+ or R) reported a convergence message of "false convergence". According to the documentation, this means: "the gradient may be computed incorrectly, the other stopping tolerances may be too tight, or either the function or the gradient of the function may be discontinuous near the current iterate". Altering the convergence criteria did not seem to make a difference. However, after experimenting with a number of starting values, the parameter reported in the table provided the lowest negative log-likelihood.

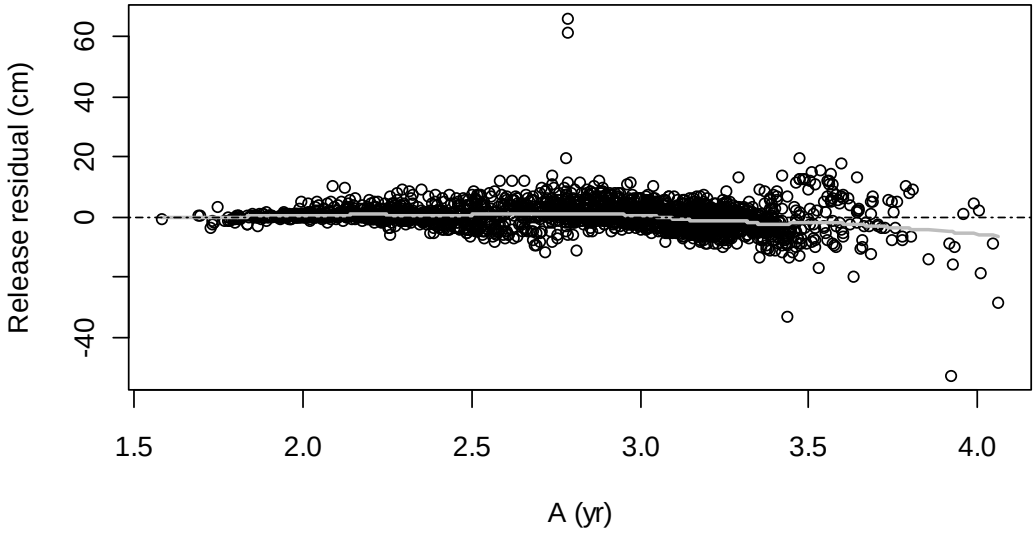
[2] Laslett G.M., Eveson, J.P., and Polacheck, T. 2002. A flexible maximum likelihood approach for fitting growth curves to tag-recapture data. Can. J. Fish. Aquat. Sci. 59: 976-986.

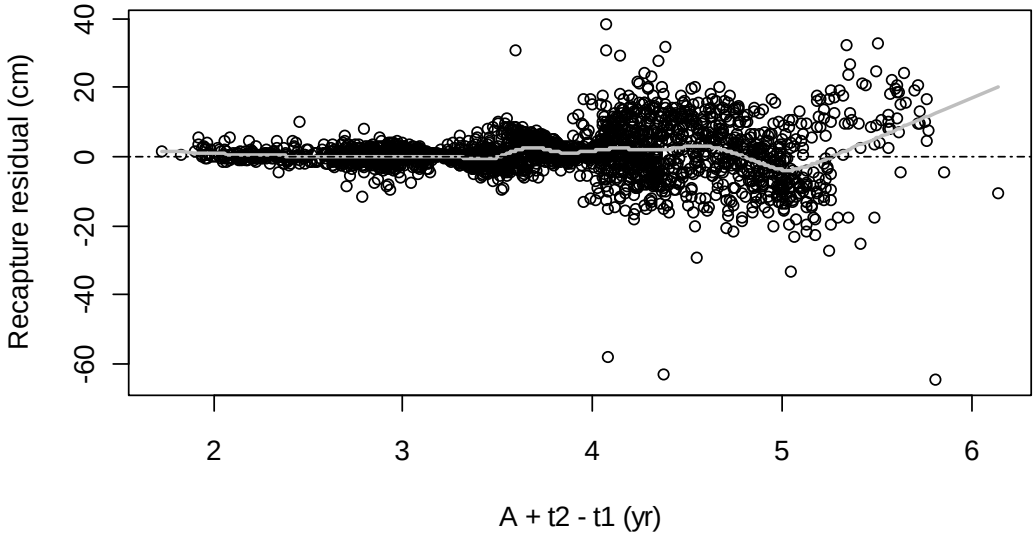
[3] Laslett G.M., Eveson, J.P., and Polacheck, T. 2004. Estimating the age at capture in capture-recapture studies of fish growth. Aust. N.Z. J. Stat. 46: 59-66.

Diagnostic plots for YFT

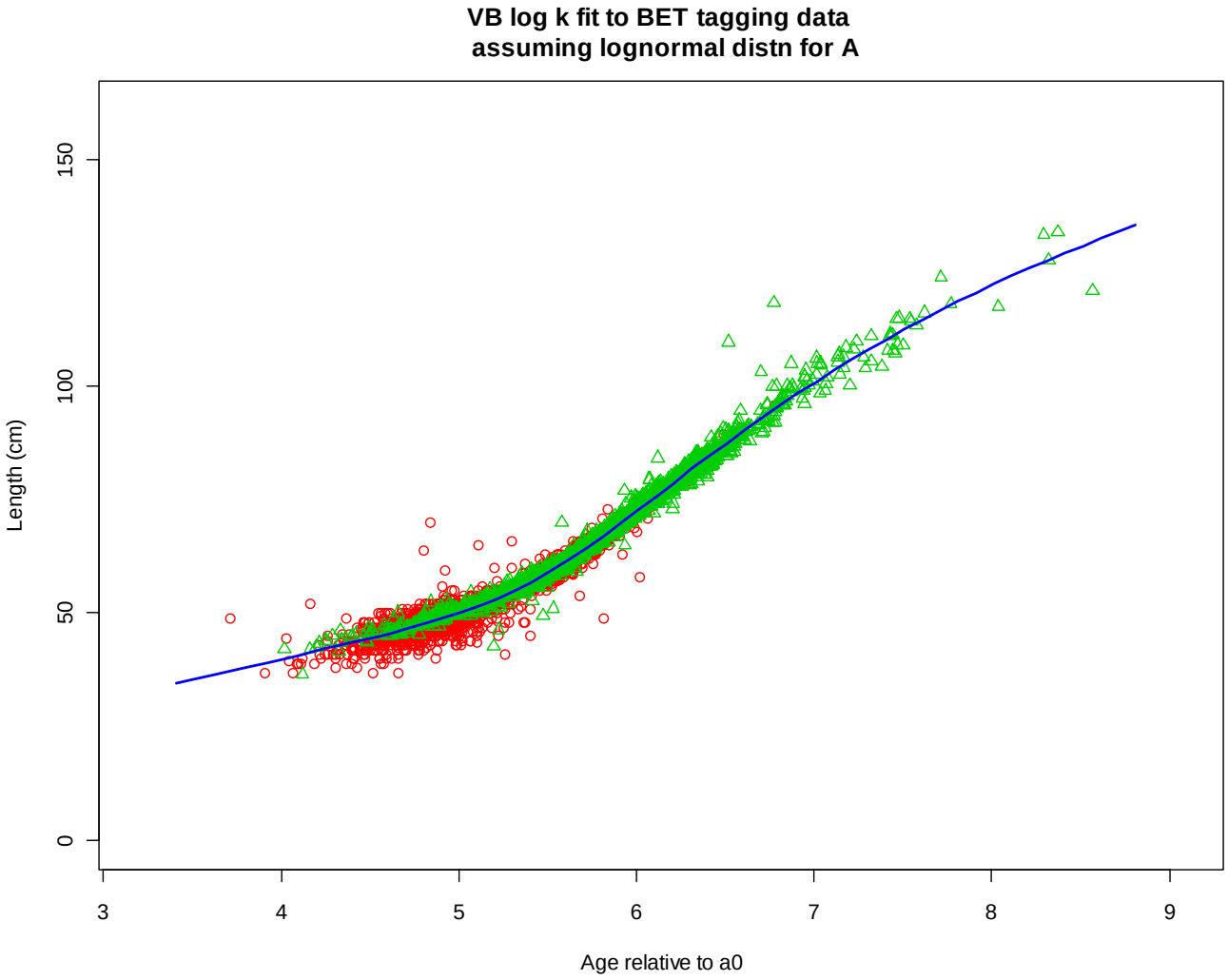


Red circles = release data
Green triangles = recapture data

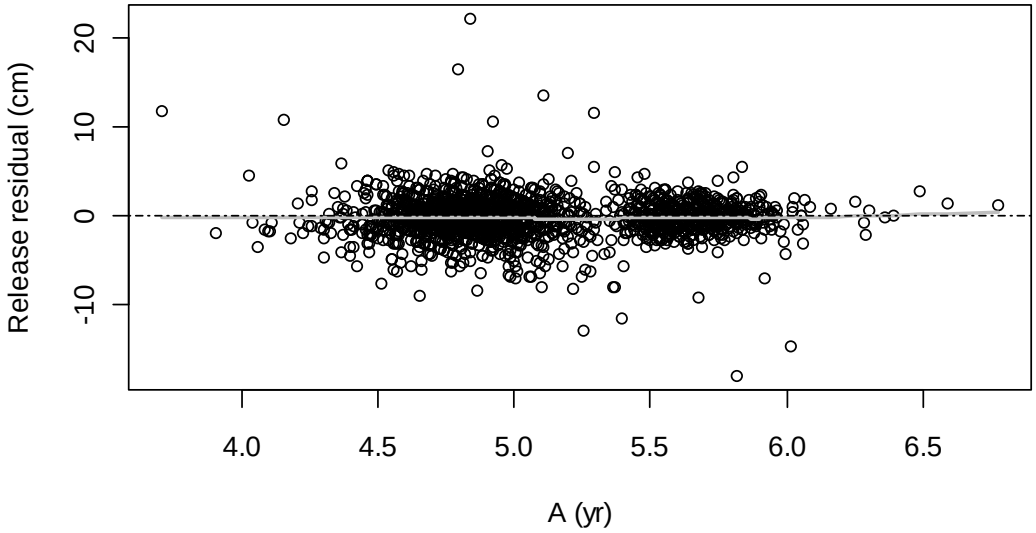

Release residual (cm)
60
40
20
0
-40
1.5
2.0
2.5
3.0
3.5
4.0
A (yr)

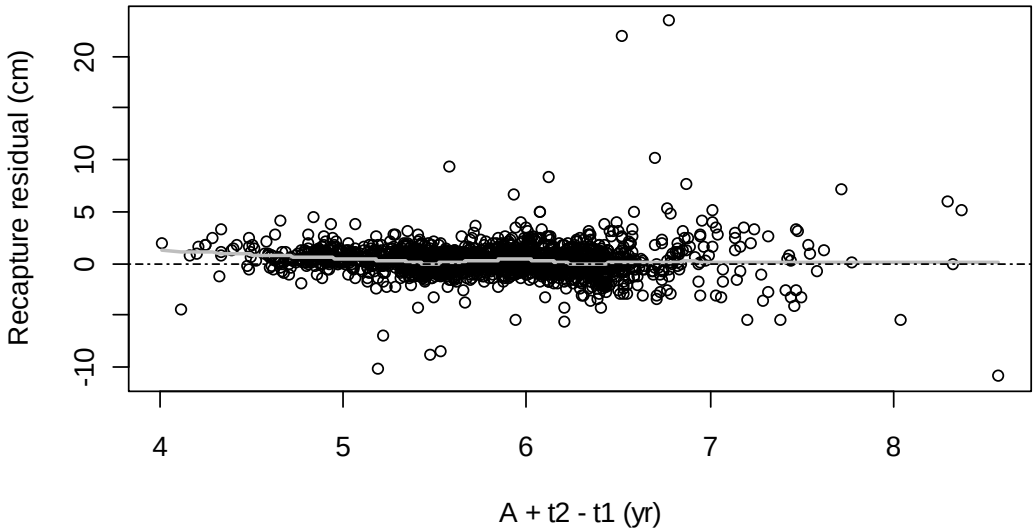

Recapture residual (cm)
40
20
0
-20
-40
-60
2
3
4
5
6
A + t2 - t1 (yr)

Diagnostic plots for BET

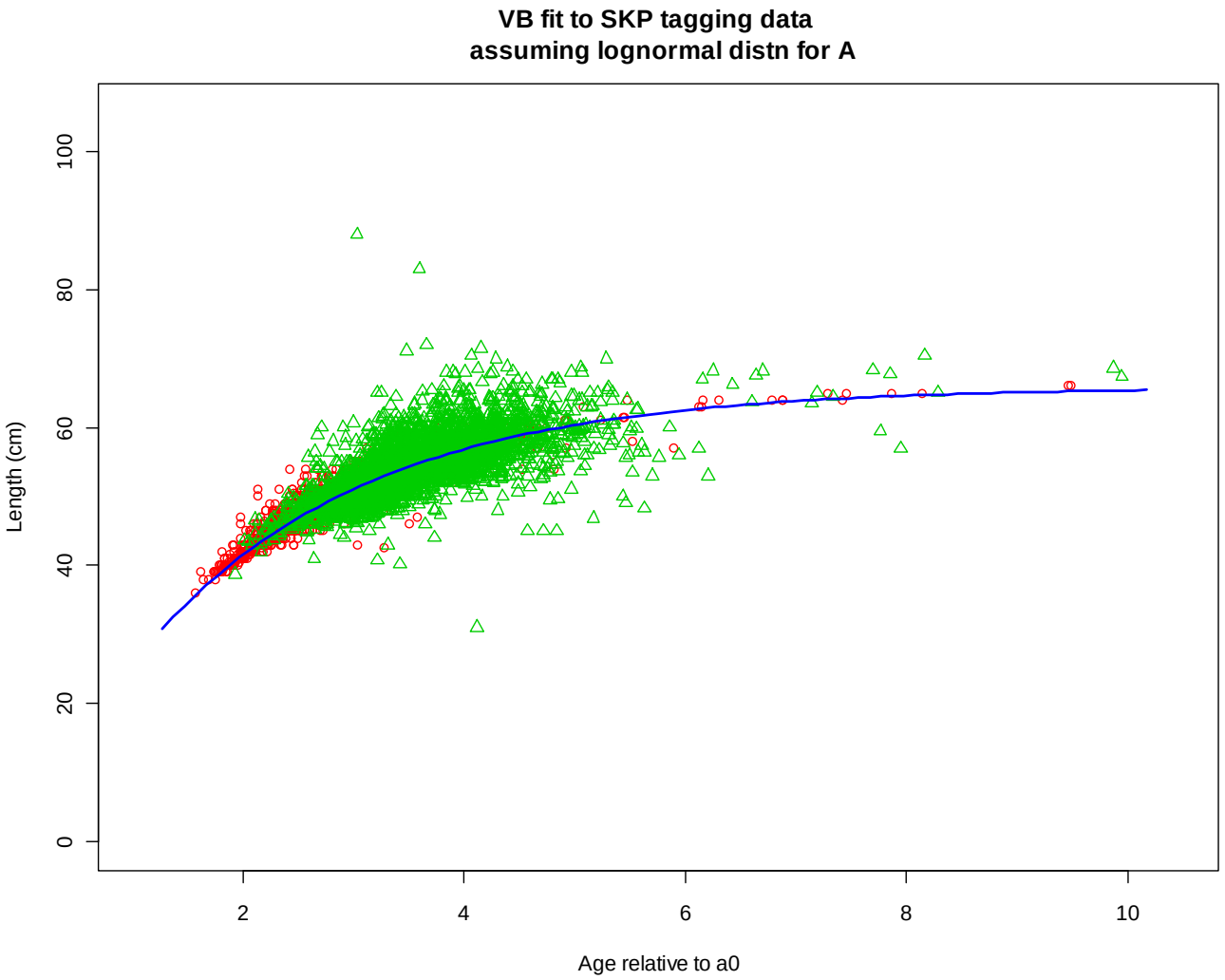


Red circles = release data
Green triangles = recapture data

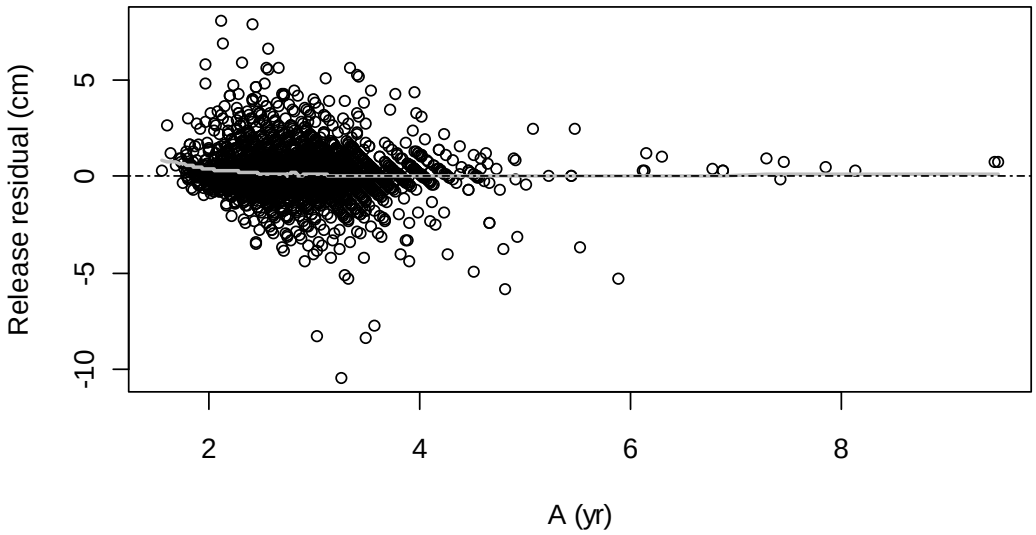

Release residual (cm)
20
10
0
-10
4.0
4.5
5.0
5.5
6.0
6.5
A (yr)

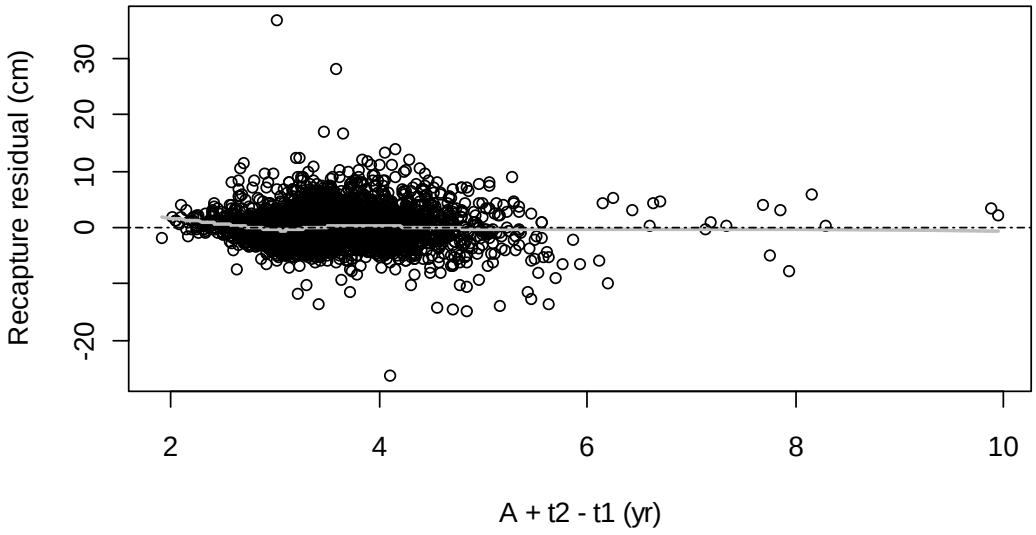

Recapture residual (cm)
20
10
5
0
-10
4
5
6
7
8
A + t2 - t1 (yr)

Diagnostic plots for SKP



Red circles = release data
Green triangles = recapture data


Release residual (cm)
5
0
-5
-10
2
4
6
8
A (yr)


Recapture residual (cm)
30
20
10
0
-20
2
4
6
8
10
A + t2 - t1 (yr)