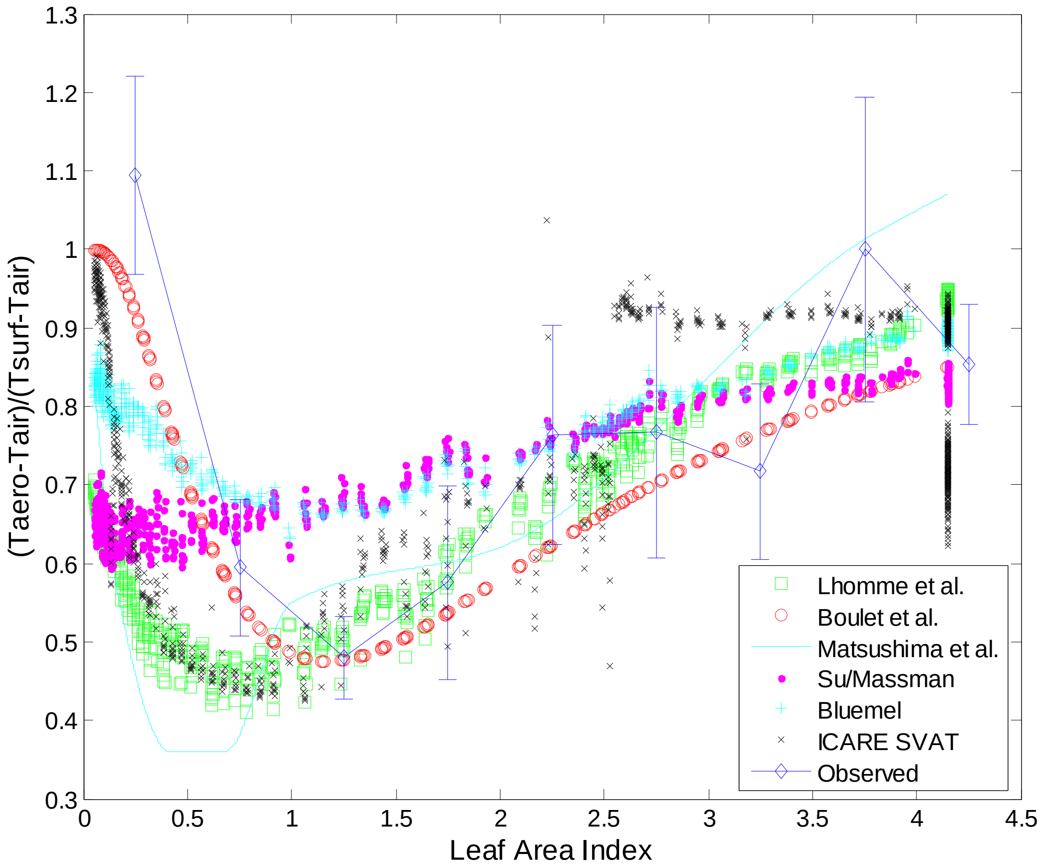

Figure 1a: β(LAI) relationships for the R3 B124 site (surface temperature from CNR1); median values per 0.5 LAI intervals are shown for the retrieved β_{obs} values.

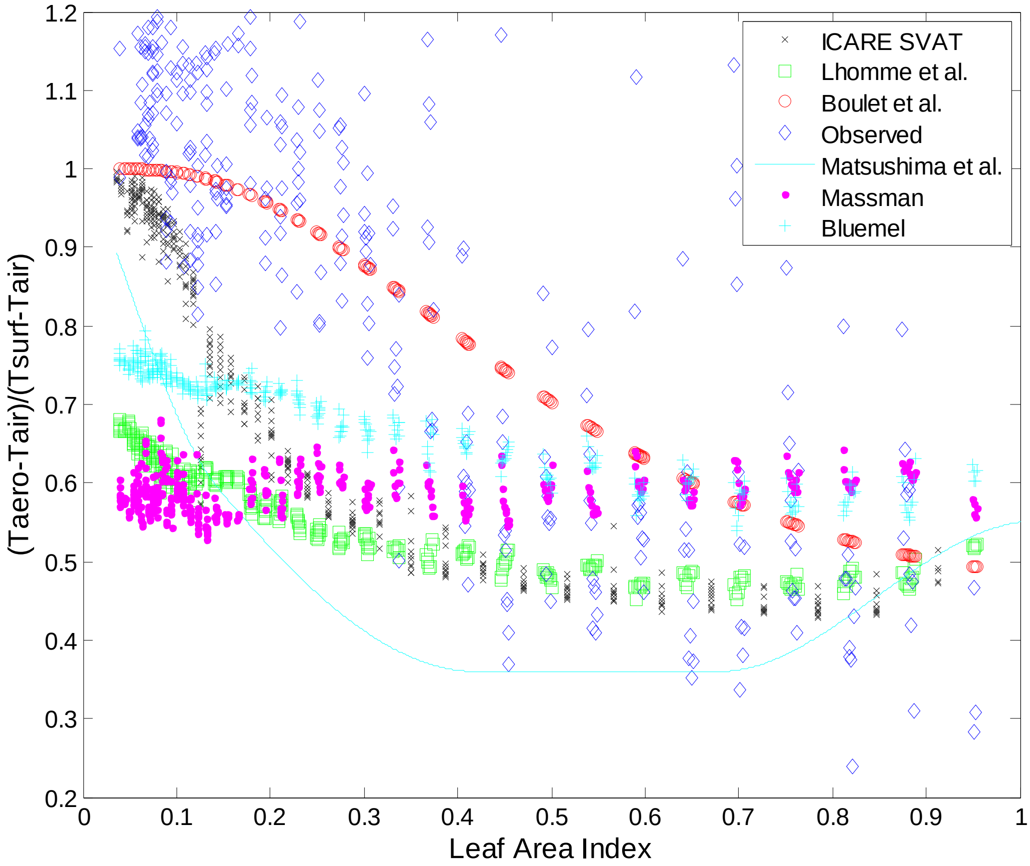

Figure 1b: subset of Figure 1a for LAI between 0 and 1. Individual retrieved β_{obs} values are shown at each time step instead of median values per 0.5 LAI interval.

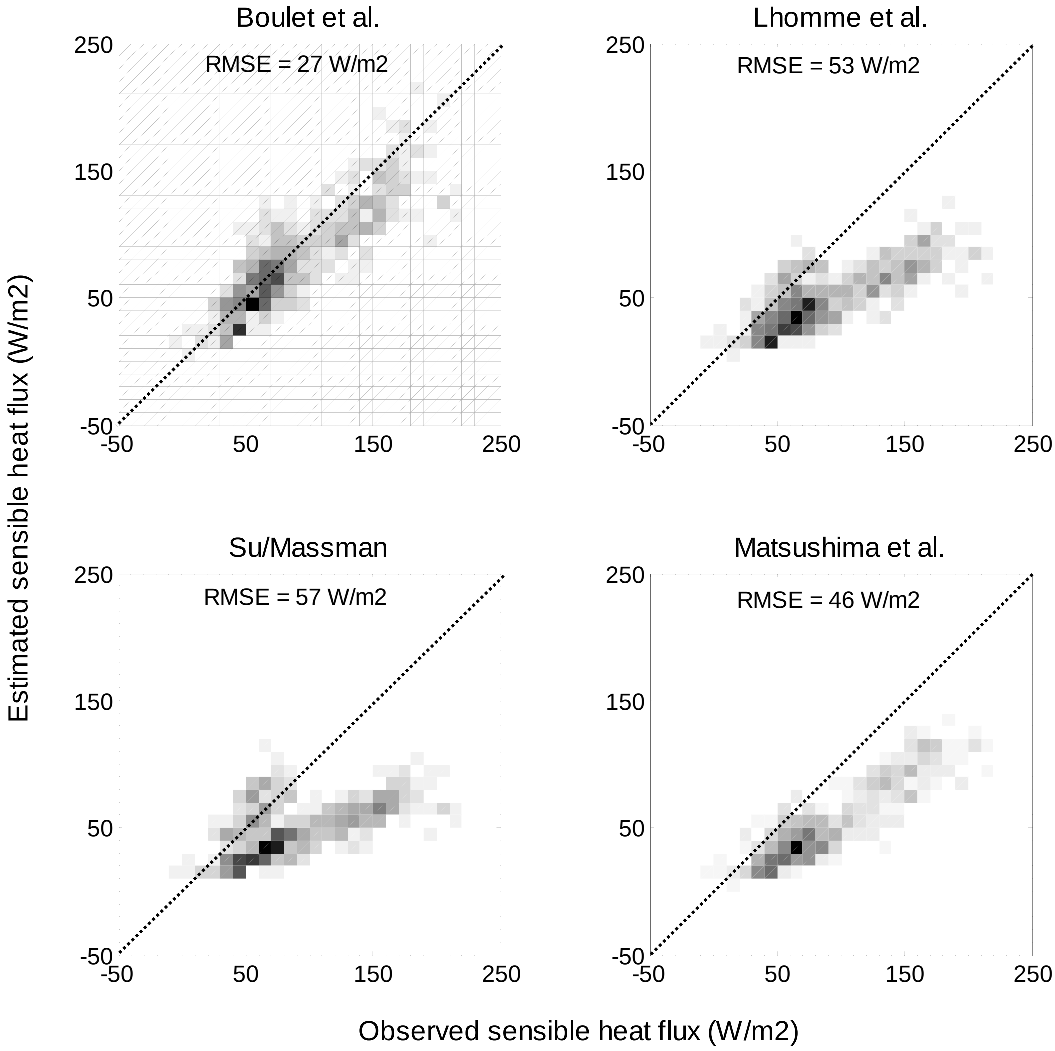

Figure 2: Scatterplots between the observed and the simulated sensible heat fluxes for the R3 B14 site for LAI values between 0 and 1. The dotted line is the 1:1 line.

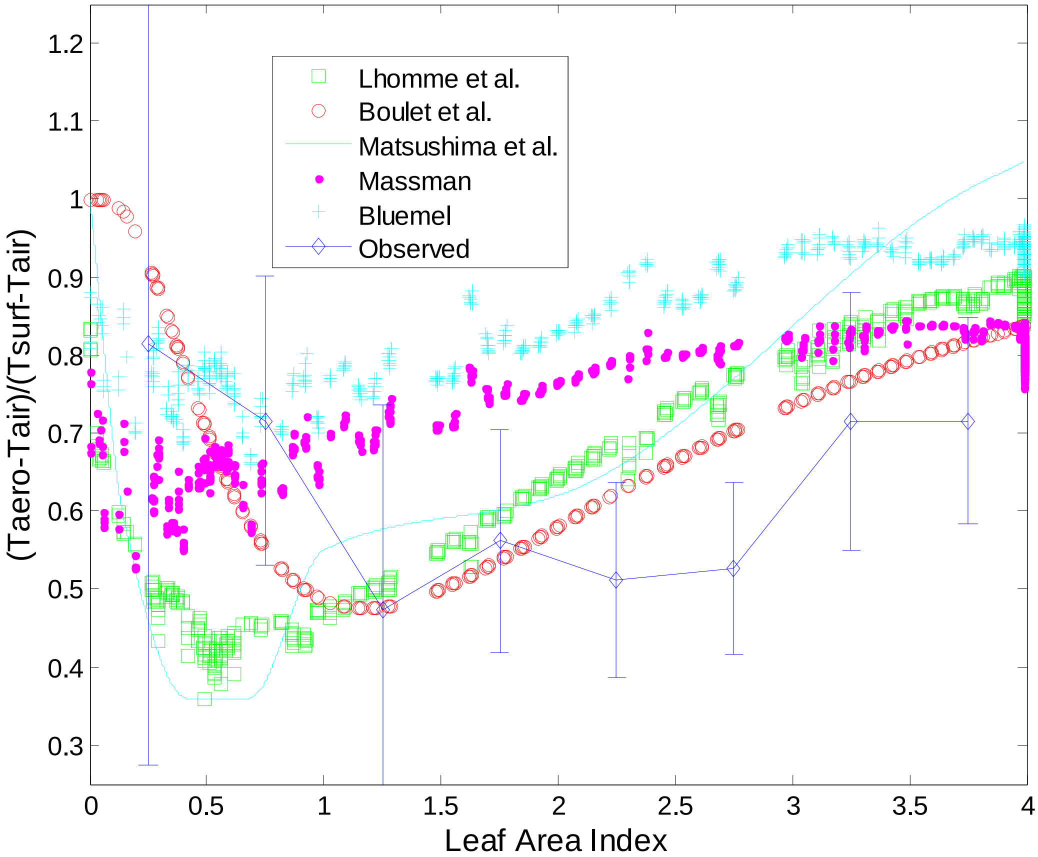

Figure 3a: β(LAI) relationships for Avignon in 2004 (Wheat); surface temperature from KT15.

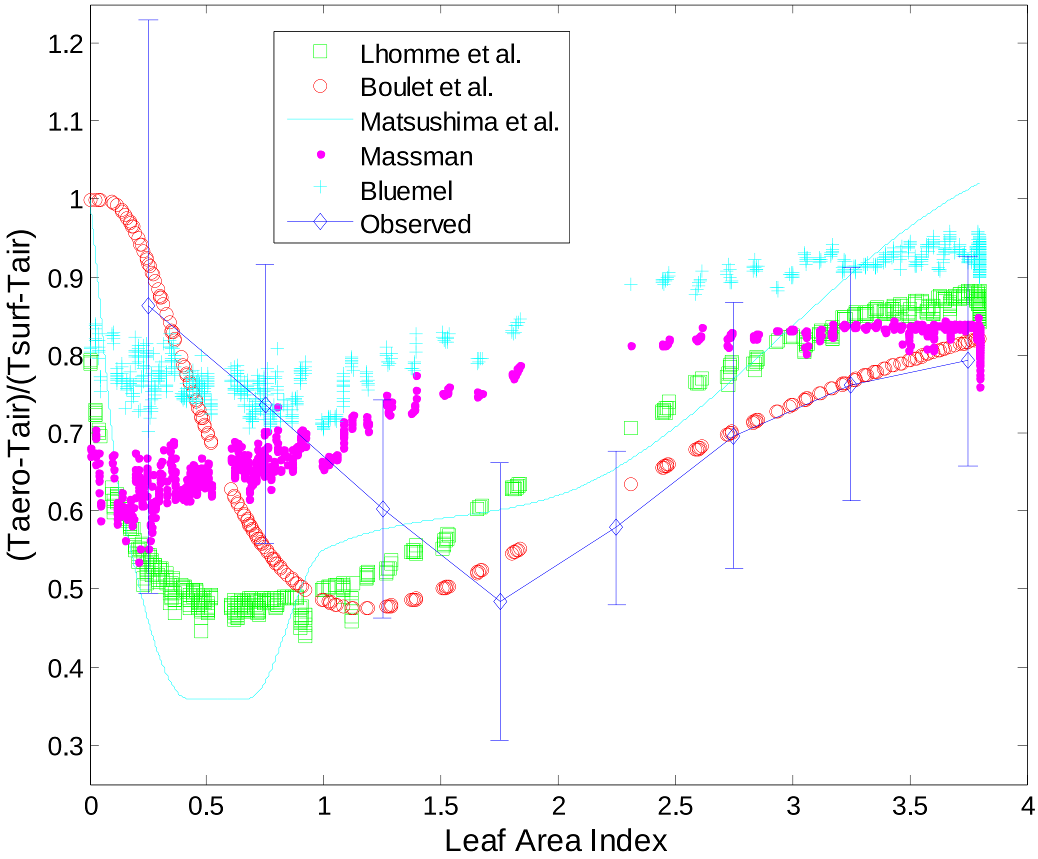

Figure 3b: β(LAI) relationships for Auradé in 2006 (Wheat); surface temperature from CNR1.

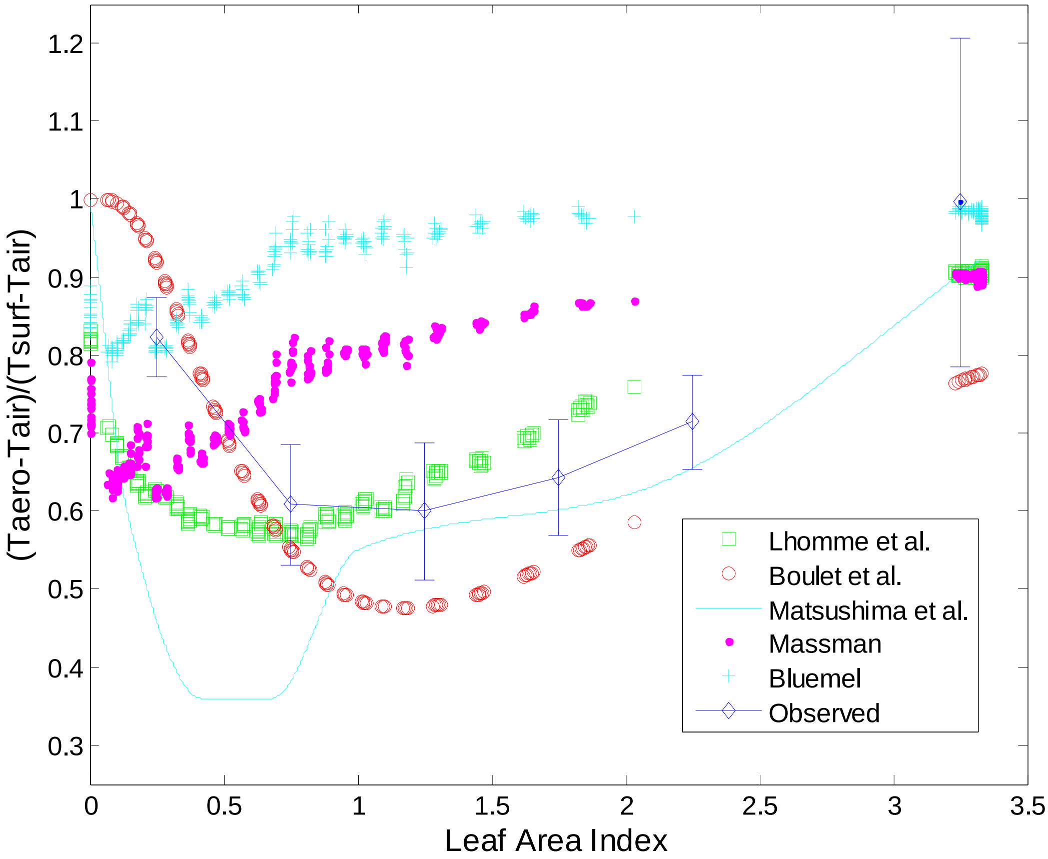

Figure 3c: β(LAI) relationships for Lamasquère in 2006 (Corn); surface temperature from IRTS-P.

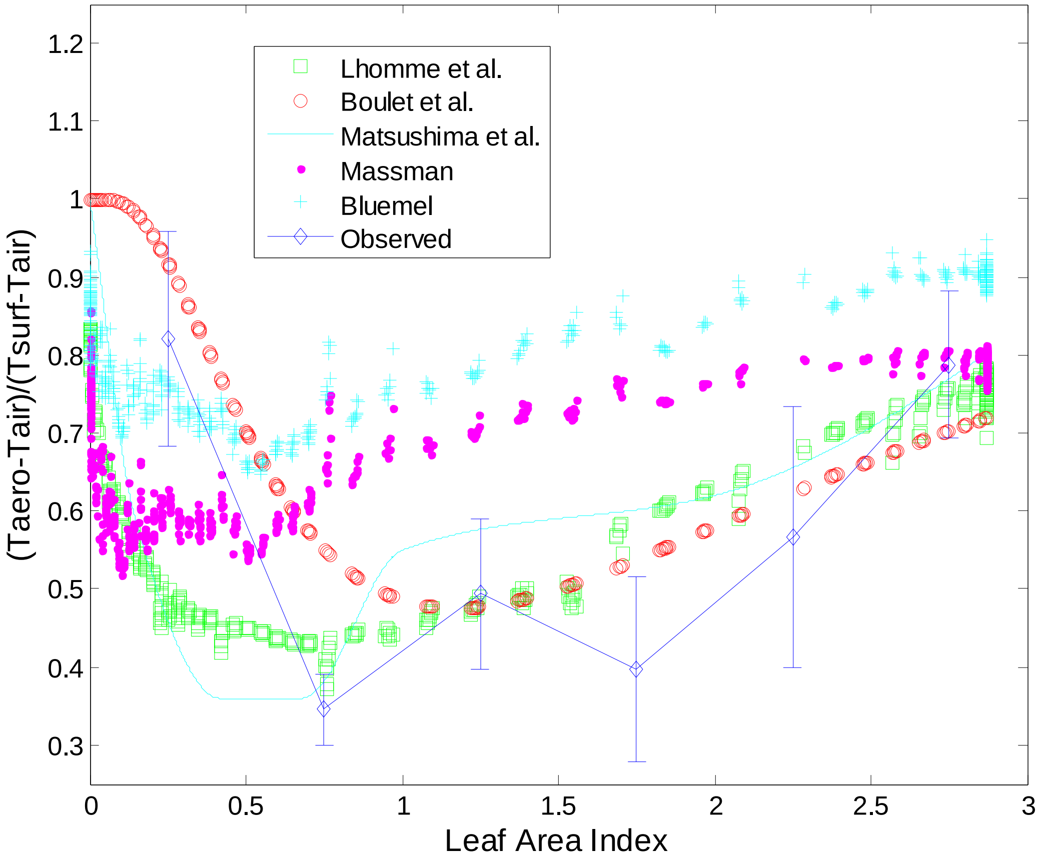

Figure 3d: β(LAI) relationships for Avignon in 2005 (Peas); surface temperature from CNR1.

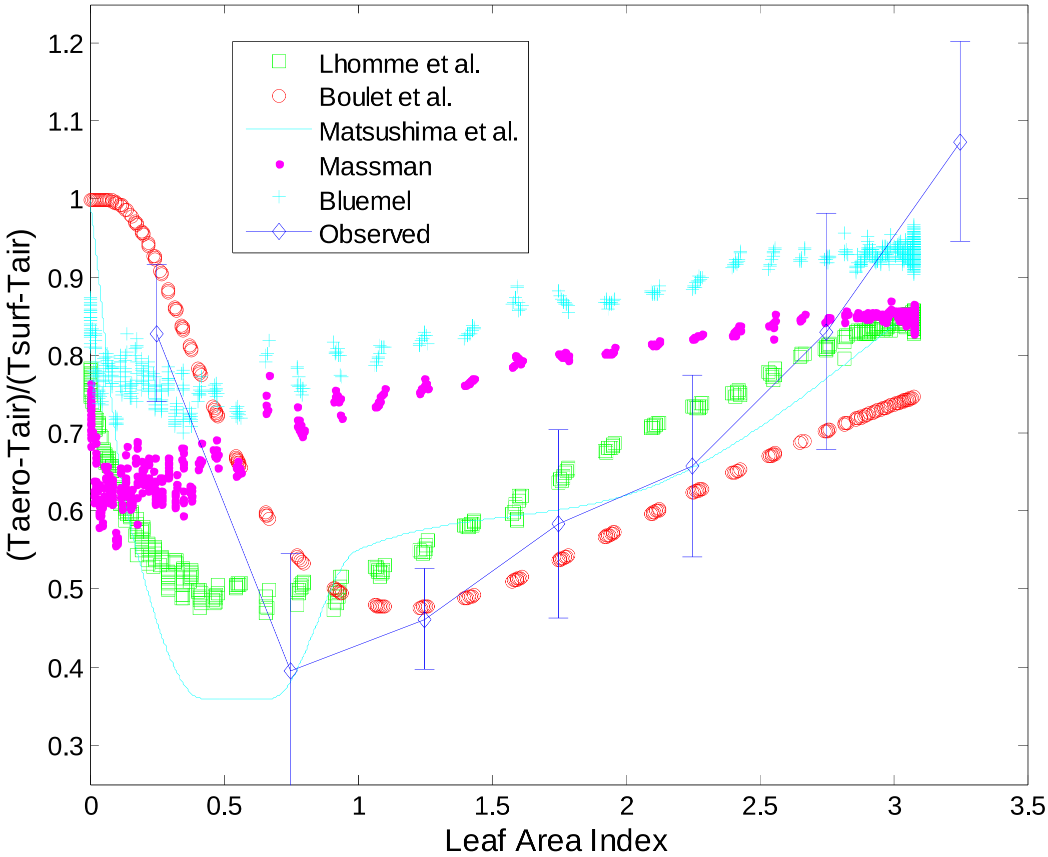

Figure 3e: β(LAI) relationships for Avignon in 2007 (Sorghum); surface temperature from KT15.

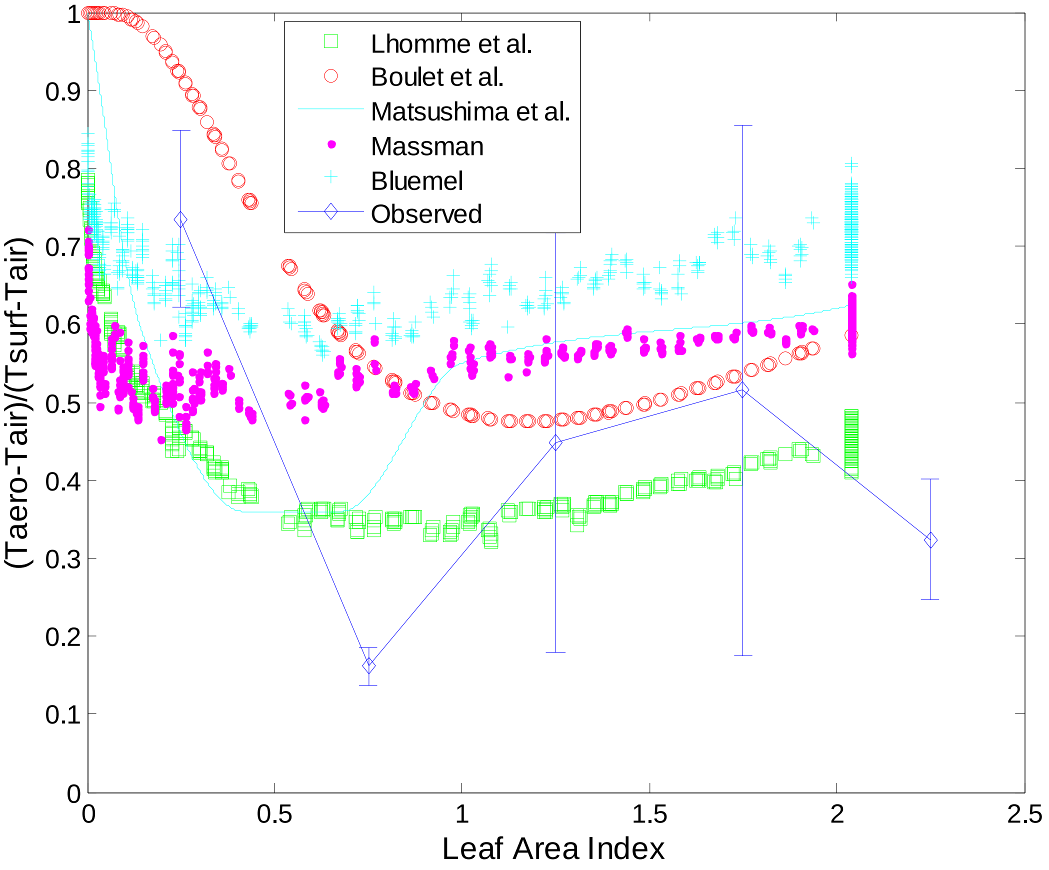

Figure 3f: β(LAI) relationships for Auradé in 2007 (Sunflower); surface temperature from CNR1.

Author	Formulae for B^{-1} or β
Lhomme et al.	$B^{-1} = 8.6347 + 24.33LAI - 40.969LAI^{2} + 26.121LAI^{3} - 8.5759LAI^{4} + 1.4378LAI^{5} - 0.0972LAI^{6}$;
Matsushima	$\beta = [0.88\ \ 0.6\ \ 0.36\ \ 0.36\ \ 0.55\ \ 0.62\ \ 1.02\ \ 1.2]$ if $LAI = [0.04\ \ 0.14\ \ 0.42\ \ 0.68\ \ 1\ \ 2\ \ 3.8\ \ 5.4]$;
Blümel	$kB^{-1}(f_c) = \frac{C(f_c)}{ln(z_{eff}/z_{omeff})} - ln\left(\frac{z_{eff}}{z_{omeff}}\right)$ where $f_c = 1 - e^{-0.5LAI}$ is the vegetation fraction cover; $C(f_c) = \left(\frac{C_s - C_c}{1 - e^{-2.6(10h/z)^{0.355}}}\right)e^{-2.6(10h/z)^{0.355}f_c} + C_s - \left(\frac{C_s - C_c}{1 - e^{-2.6(10h/z)^{0.355}}}\right)$; $C_s = ln\left(\frac{z}{z_{oms}}\right)\left[ln\left(\frac{z}{z_{oms}}\right) + kB_s^{-1}\right]; kB_s^{-1} = 2.46\,Re^{0.25} - ln(7.4)$ where $Re = z_{oms}u_*/\nu$ is the Reynolds number and ν is the viscosity; $C_c = ln\left(\frac{z-d}{z_{om}}\right)\left[ln\left(\frac{z-d}{z_{om}}\right) + kB_c^{-1}\right]$; $kB_c^{-1} = 16.4(\sigma_\alpha LAI^{3})^{-0.25}\left[0.05\,u_{obs} \Big/ ln\left(\frac{z-d}{z_{om}}\right)\right]^{0.5}$; $\sigma_\alpha = 1 - \frac{0.5}{0.5 + LAI}e^{-LAI^{2}/8}; z_{eff} = z - f_c d$; $z_{omeff} = z_{eff}\,e^{-k\Big/\sqrt{g(f_c)\left[\frac{k}{ln(\{z-d\}/z_{om})}\right]^{2} + (1-g(f_c))\left[\frac{k}{ln(z/z_{oms})}\right]^{2}}}$; $g(f_c) = \sqrt{f_c} + f_c(1 - f_c)$; Z_{oms}=0.005 is the roughness length for bare soil;
Su/Massman	$B^{-1}(f_c) = \frac{1}{2\frac{u_*}{u(h)}\left(1 - e^{-0.1LAI\left(\frac{u_*}{u(h)}\right)^{-2}}\right)}f_c^{2} + \frac{2\frac{u_*}{u(h)}\frac{z_{om}}{h}}{1.27\,Re^{-0.5}}f_c(1 - f_c) + B_s^{-1}(1 - f_c)^{2}$ where *u(h)* is the wind speed at the top of the canopy

Table 1: Formulae for B^{-1} or β according to several authors (all notations as in the text)

	Boulet et al.	Lhomme et al.	Matsushima	Su/Massman	Blümel
Wheat R3 2004	52	**62**	**76**	**61**	57
Wheat Avignon 2004	*45*	*46*	52	50	*47*
Peas Avignon 2005	55	53	50	53	53
Wheat Avignon 2006	*41*	**-***	*47*	*45*	*40*
Sorghum Avignon 2007	54	*47*	**73**	52	**60**
Wheat Auradé 2006	*45*	*49*	**66**	*47*	54
Sunflower Auradé 2007	**72**	**61**	*45*	**65**	59
Corn Lamasquère 2006	**78**	**88**	**95**	**86**	**76**
Wheat Lamasquère 2007	*45*	**60**	51	*48*	50

Table 2: RMSE (W/m^2) between simulated and observed sensible heat fluxes (in bold: values >60 W/m^2, in italics: values <50 W/m^2).

(* outside the range of formula validity)