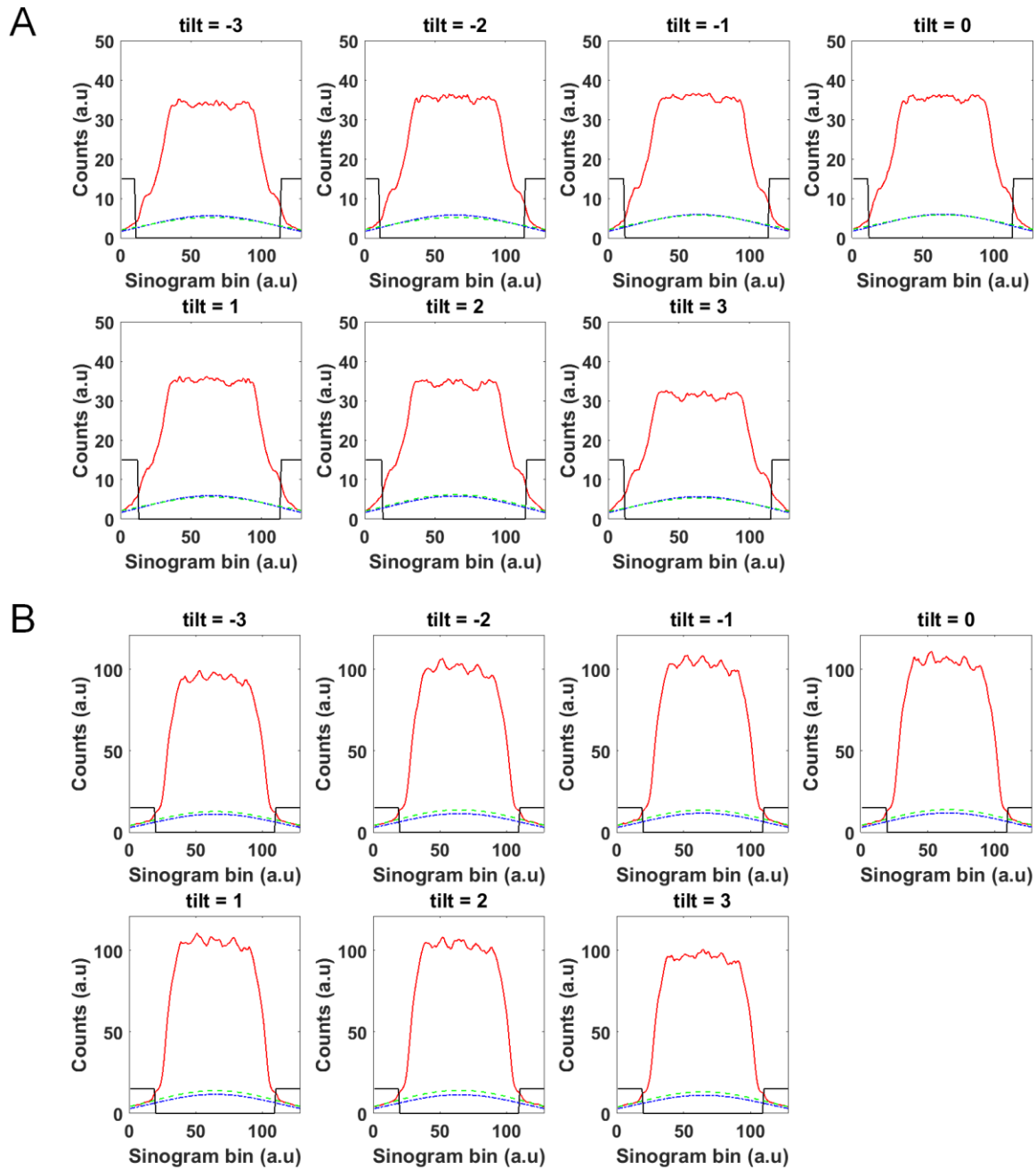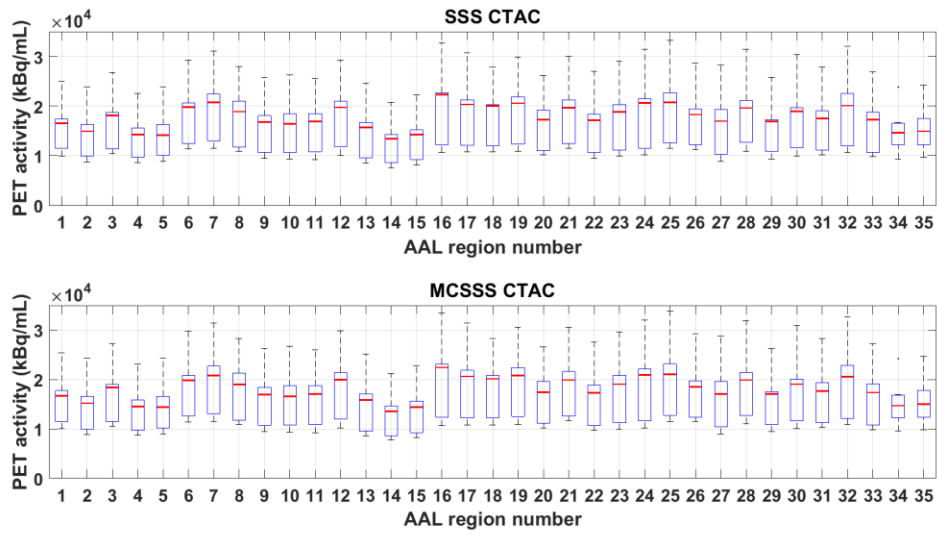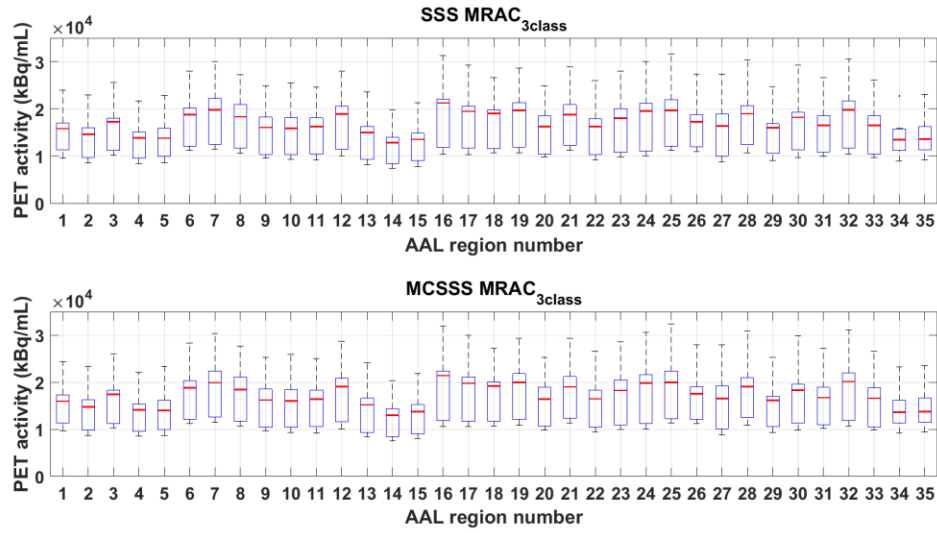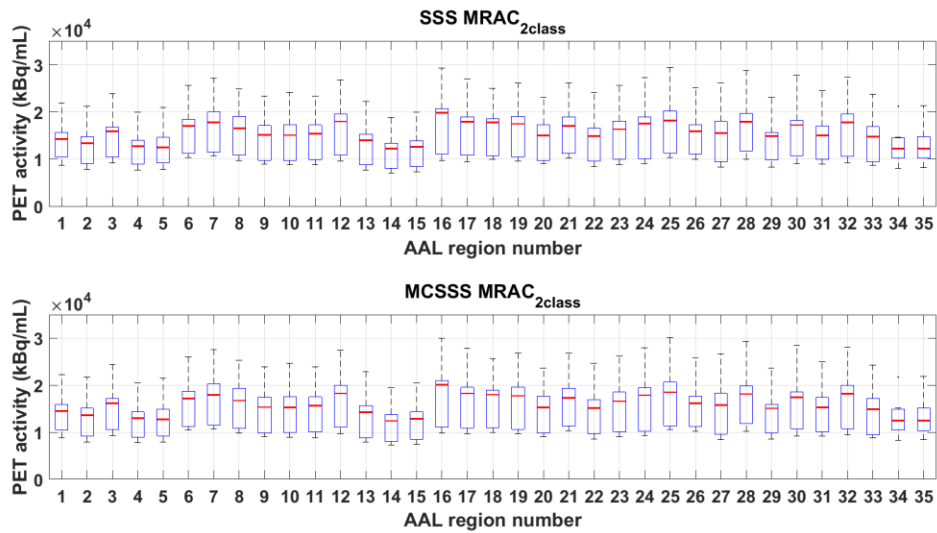**SUPPLEMENTAL FIGURE 1.** Measured sinogram profiles of each individual tilt angle (N=7, from -3 to 3) when using CTAC and MRAC from the phantom study. For each tilt, the sinograms were averaged over all phi angles and the radial profile was plotted over the central axial bin. (A) shows the sinogram profiles for CTAC, (B) shows the sinogram profiles for $MRAC_{2class}$ and (C) shows the sinogram profiles for $MRAC_{3class}$. The red line denotes randoms-corrected emission

sinogram, the black line denotes transmission mask boundaries, while the green and blue lines denote SSS and MCSSS scatter correction sinograms for each algorithm, respectively. Only a small difference can be detected between the scatter sinograms regardless of the attenuation correction method. The smallest difference is achieved when using CTAC.

SUPPLEMENTAL FIGURE 2. Sinogram profiles from two clinical subjects (cases 4 and 1) presenting the smallest (A) and largest (B) detected difference between SSS and MCSSS algorithms with CTAC reconstructed PET data. Each individual tilt angle (N=7, from -3 to 3) is presented in a subplot. The sinograms were averaged over all phi angles and the radial profile was plotted over the central axial bin. (A) shows the sinogram profiles for the best case (smallest difference between SSS and MCSSS) subject and (B) shows the sinogram profiles for the worst case (largest difference between SSS and MCSSS) subject. In (B), MCSSS shows a poorer fit compared to SSS. The red line denotes randoms-corrected emission sinogram, the black line denotes transmission mask boundaries, while the green and blue lines denote SSS and MCSSS scatter correction sinograms for each algorithm, respectively.

A

SSS CTAC

MCSSS CTAC

B

SSS MRAC$_{3class}$

MCSSS MRAC$_{3class}$

C

SSS MRAC$_{2class}$

MCSSS MRAC$_{2class}$

SUPPLEMENTAL FIGURE 3. Boxplots of individual VOI (35 VOI over 7 patients) with both scatter correction methods using CTAC (A), MRAC$_{2class}$ (B) and MRAC$_{3class}$ (C). The red line denotes the median activity, the edges of the box are the 25th and 75th percentiles, the whiskers denote the minimum and maximum activity, while individual outliers are defined by a black dot. MCSSS results in slightly higher activity compared to SSS, although the differences between MCSSS and SSS are small regardless of the attenuation correction method.

SUPPLEMENTAL TABLE 1.

Anatomical region numbers and their corresponding names as given in the AAL atlas.

Region Number	Region name		Region Number	Region name
1	Precentral		18	Lingual
2	Rolandic_Oper		19	Occipital
3	Supp_Motor_Area		20	Fusiform
4	Olfactory		21	Postcentral
5	(Region not named)		22	SupraMarginal
6	Frontal_Sup		23	Angular
7	Frontal_Mied		24	Precuneus
8	Frontal_Inf		25	Paracentral_Lobule
9	Rectus		26	Caudate
10	Insula		27	Putamen
11	Cingulum_Ant		28	Pallidum
12	Cingulum_Mid		29	Thalamus
13	Cingulum_Post		30	Heschl
14	Hippocampus/ParaHippocampal		31	Parietal
15	Amygdala		32	Temporal
16	Calcarine		33	Vermis
17	Cuneus		34	Cerebellum_Crus
			35	Cerebellum