



Supplementary Figure 1. MS patient results: FLAIR (A), PDW (B), post-contrast MPRAGE (C), and ViSTa (D). The scan parameters for ViSTa were resolution = $1.88 \times 1.88 \text{ mm}^2$, number of echoes = 32 echoes, TE = 1.85 ms to 77 ms with echo spacing of 2.18 ms, flip angle for excitation = 90° , slice thickness = 3 mm, number of averages = 1, and total scan time = 2.5 min. The first four echoes (1.85 to 8.39 ms) were averaged to improve SNR. In this subject, post-contrast MPRAGE was not acquired and substituted by 1 year prior data.