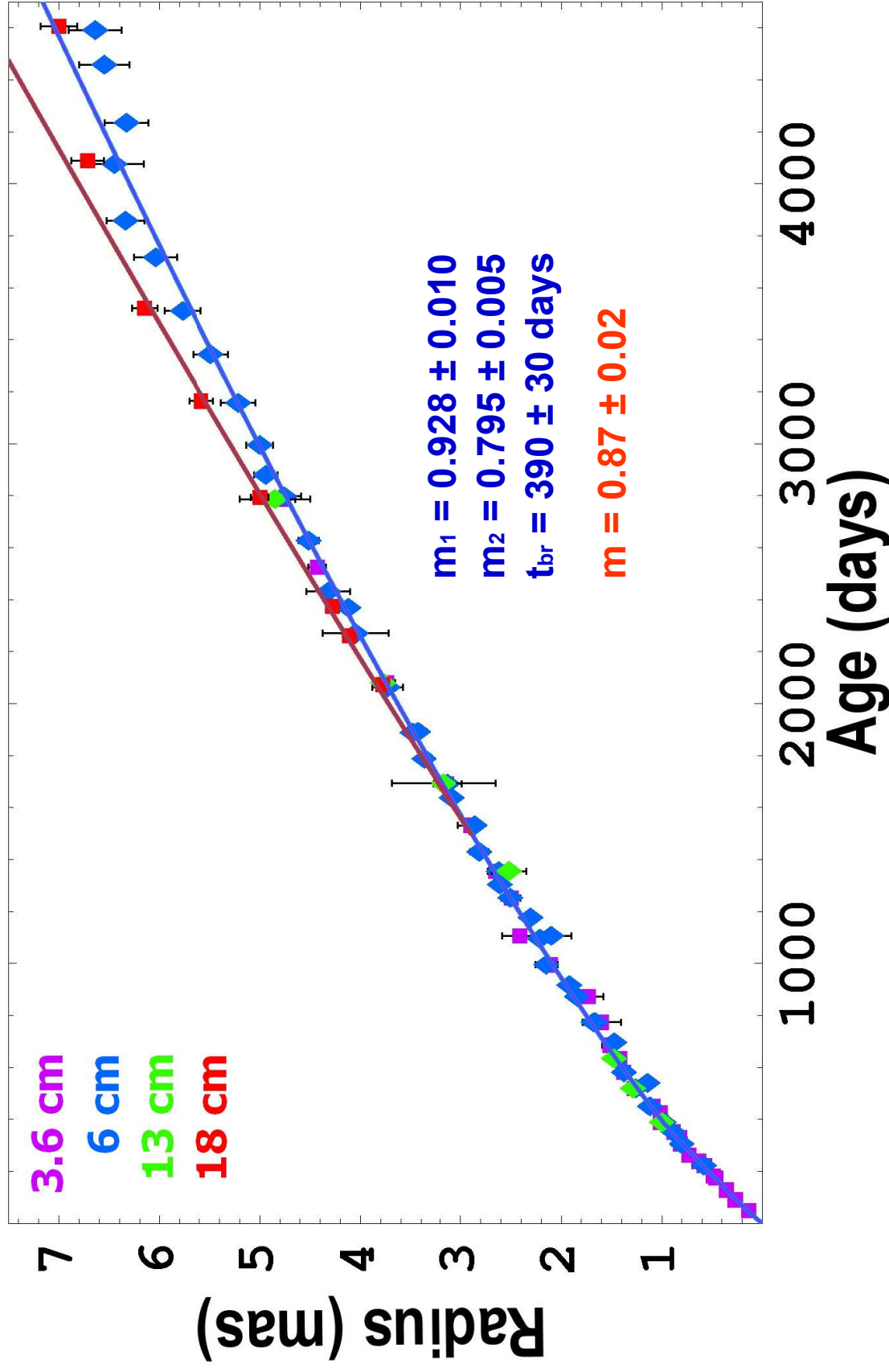


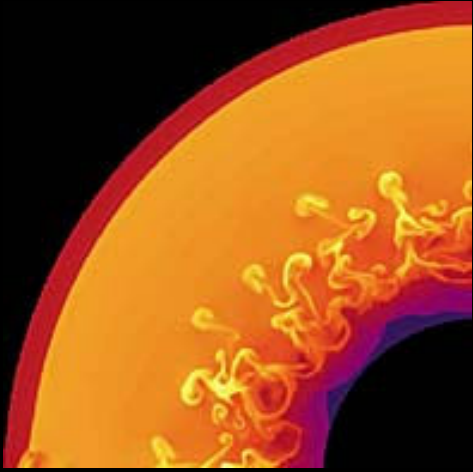
SN1993J Main Results

- A spherical expansion: deviations from circularity at ~2% level
- A self-similar expansion in a constant wind CSM
- A wide shell: 30% of outer radius
- Deceleration dependent on frequency: Ejecta partially transparent at high freqs after day 1500, but not at 1.7GHz
- CSM features at ~100d and beyond 3100d

Complete Expansion Curve

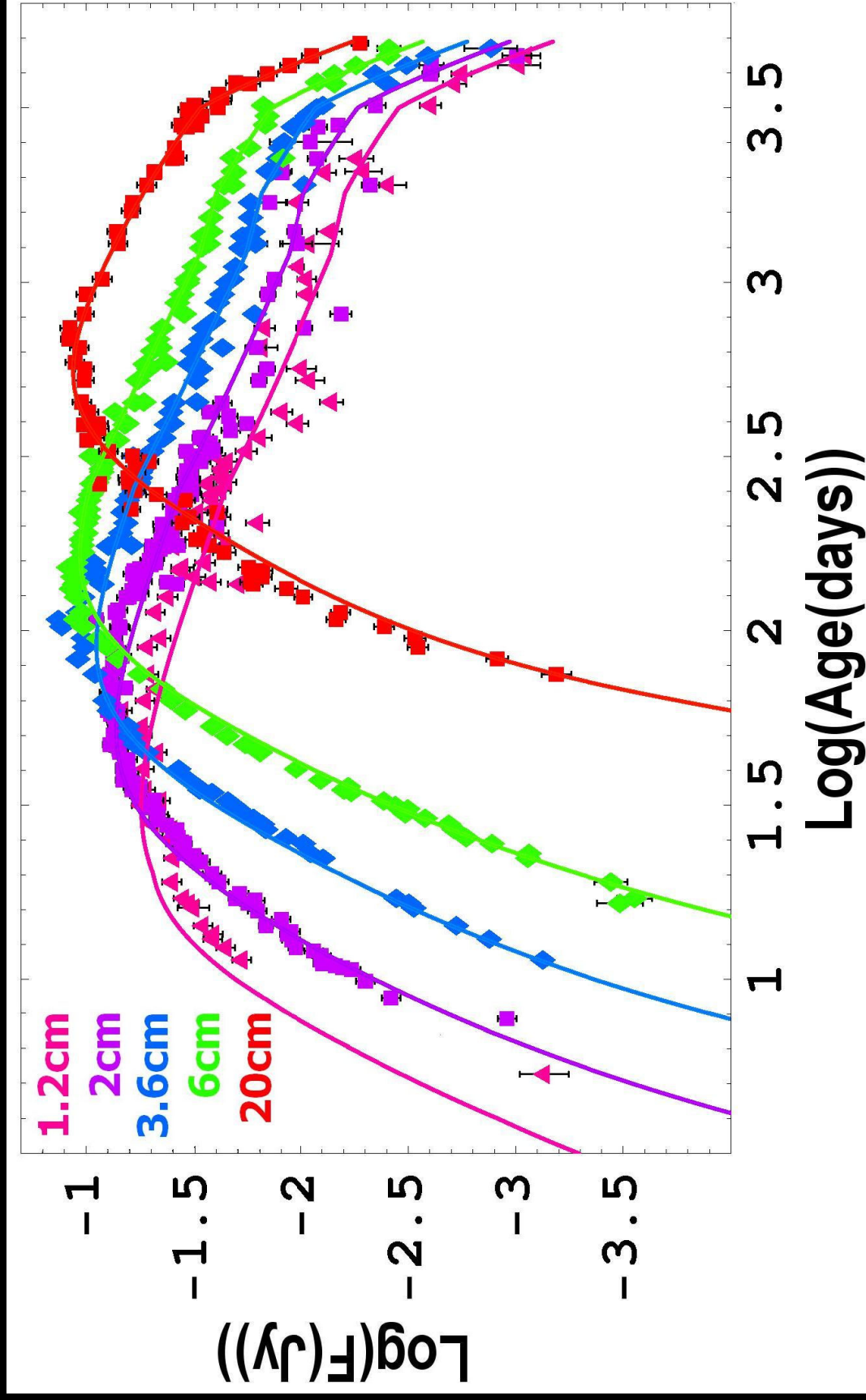


RAMSES: Simultaneous Fit of the Expansion and the Radio Light- Curves → Main Features



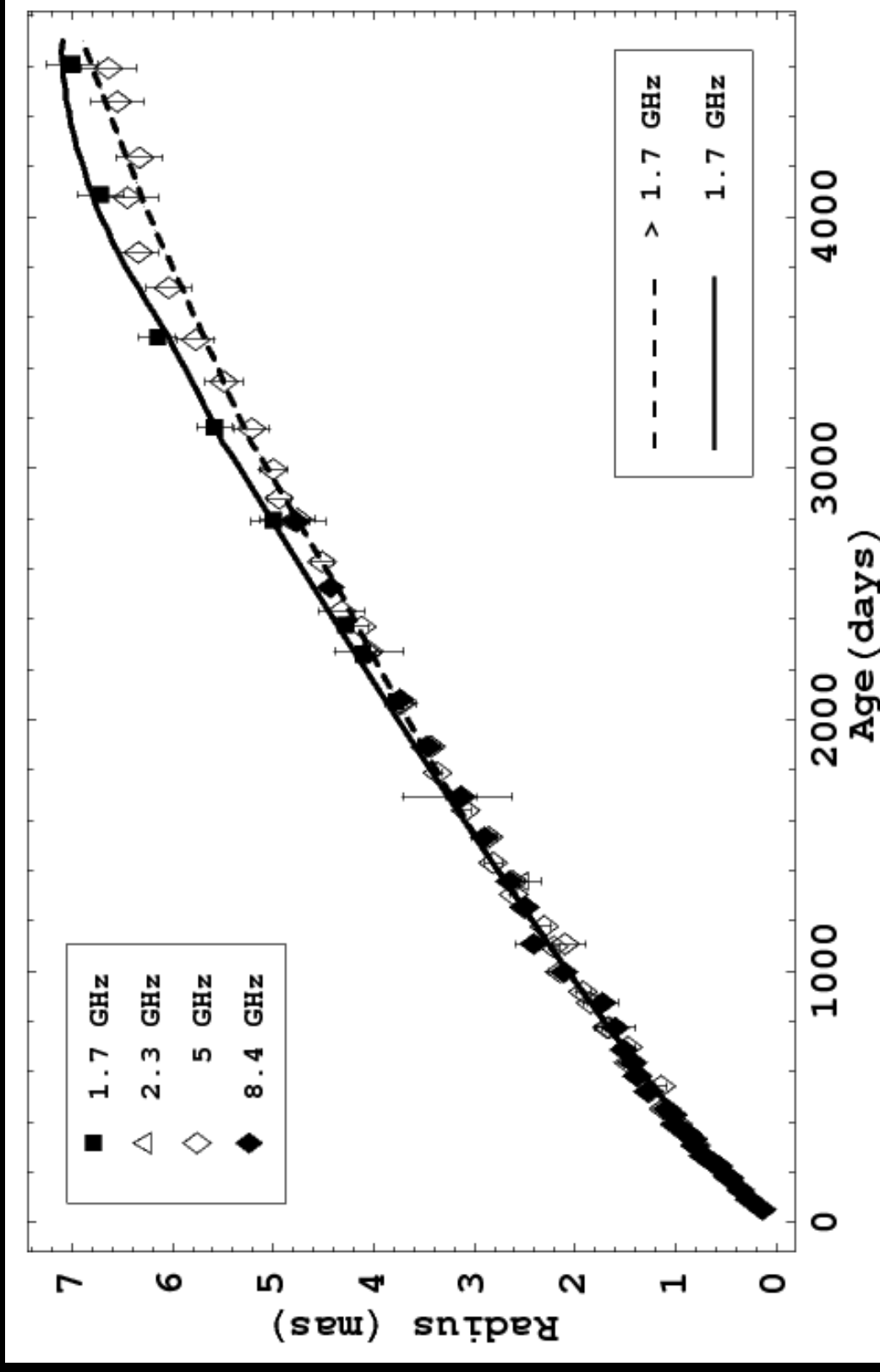
- Scales all the hydrodynamic variables (and the specific magnetic field energy density) according to the Chevalier's model.
- Evolves the electron population taking into account the continuous electron acceleration in the shock, the main radiative losses, and synchrotron self-absorption.

RAMSES Results



RAMSES

RAMSES Results



RAMSES Results

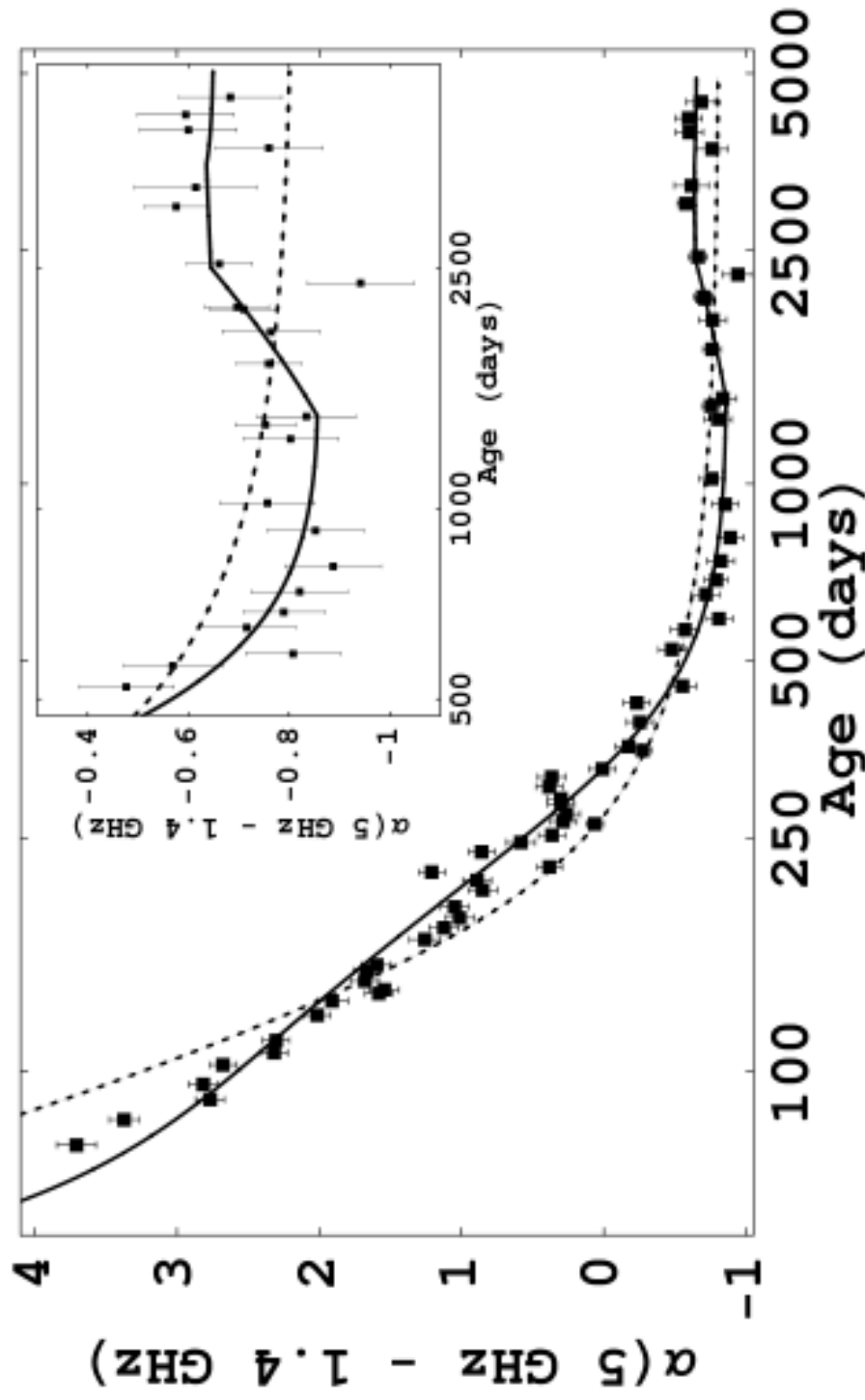
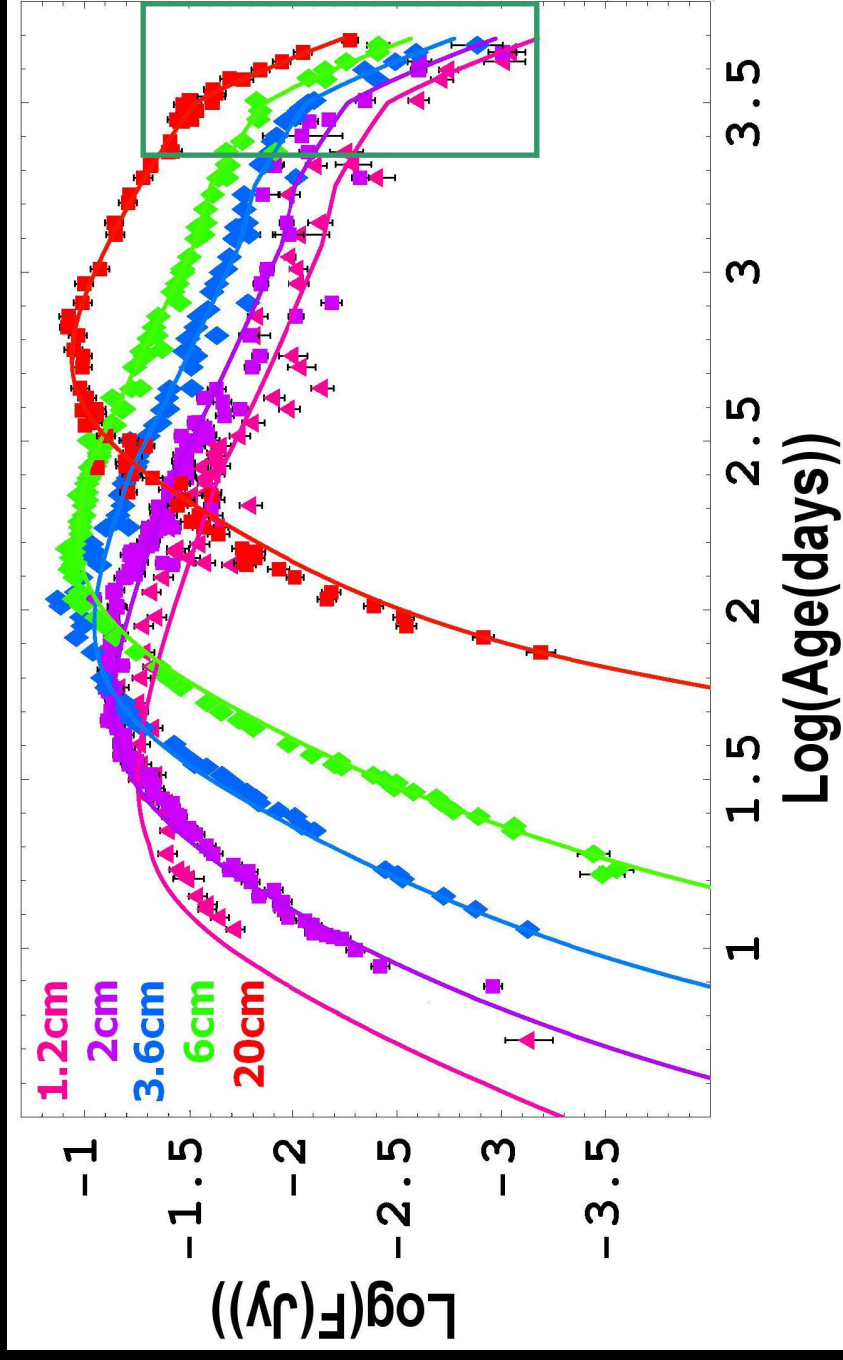


Fig.6. Observed spectral indices between 1.4 and 5 GHz reported by Weiler et al. (2007). Dashed line, best-fit model reported by Weiler et al. (2007). Continuous line, best-fit obtained with the RAMSES model. Inset is a blow up from day 500 to 5000.

Additional: CSM Cutoff and Electron Escape



Increased flux density drop at late epochs can be modelled as a continuous electron-escaping term (mean-life time of ~ 1500 days), an increased CSM density drop ($s = 2 \rightarrow 4$) OR a cutoff of the CSM after day 3100.

Marcaide et al., A&A, 505 (2009)
(analysis of our data spanning 10 yrs)

Martí-Vidal et al. A&A (submitted)
(analysis of all existing data over 13 yrs)

Martí-Vidal et al. A&A (accepted)
(numerical simulation with RAMSES)