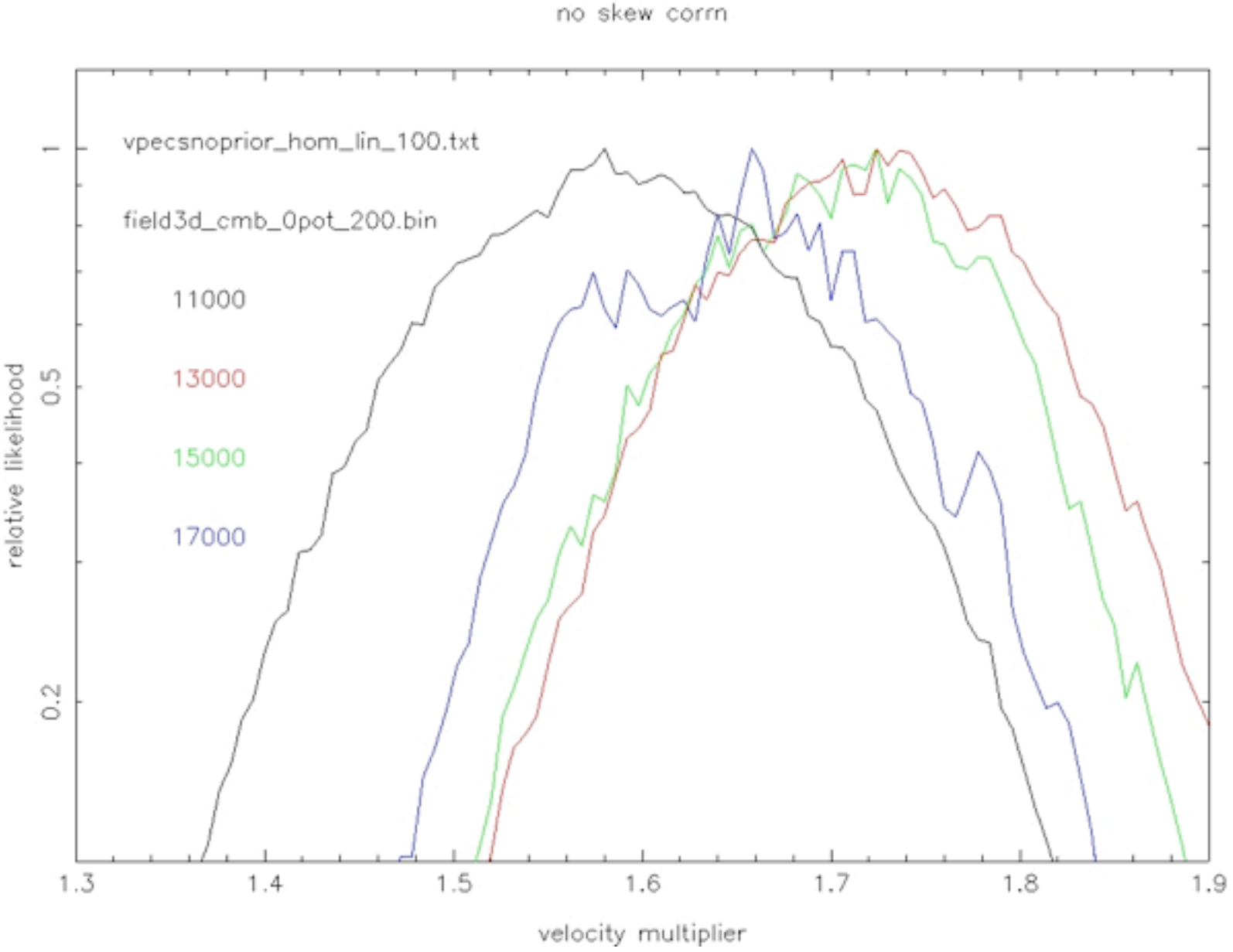

Cosmic Flows in the Rainforest
20 Feb 2012
Comparing observed and reconstruction velocities
Jeremy Mould and the 6dF team
SWIN BUR NE
SWINBURNE UNIVERSITY OF TECHNOLOGY
6dF GS

6dF Magoulas fundamental plane and Erdogdu reconstructed peculiar velocities



Density $\Omega = \Omega_m$

- In linear theory $\nabla.\mathbf{v} = -\delta\rho/\rho\ f(\Omega)H_0$
- Erdogdu assumed $f(\Omega) = \Omega^{0.6}/b = 0.4$
- Our fit to 6dF gives $f(\Omega) = 0.64$
- This gives b = 1.1 for WMAP7 matter density
- Lavaux et al. found $\Omega = 0.31+/-0.05$ with b = 1
  - astro-ph 0810.3658
- Good agreement

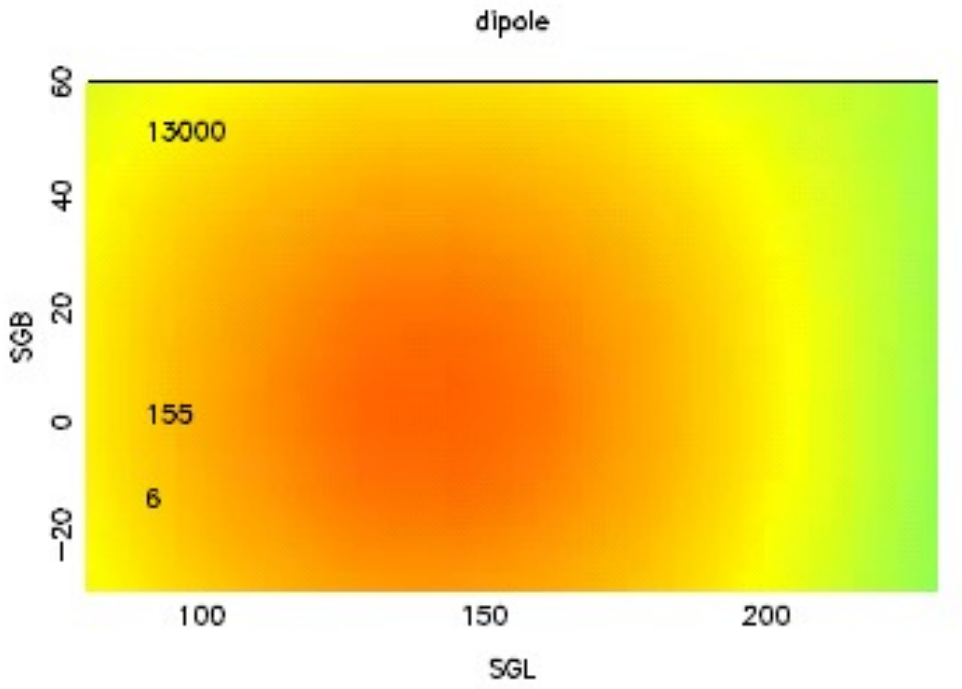
Caveats

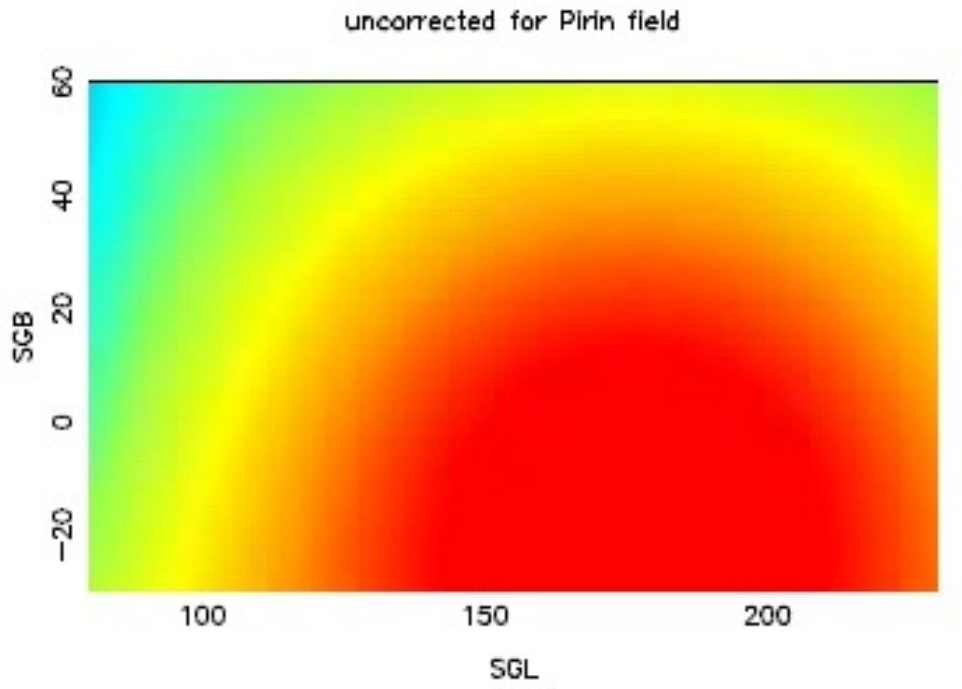
- Mocks still need to be run to determine what is the appropriate cutoff redshift and selection effects
- Model overdensity of 0.08 within 200 Mpc ?
  - this affects velocities at 100 Mpc by 100 km/s
- 6dF is southern hemisphere only
- Random error is ~0.1 in $\Omega^{0.6}$

Future Work: FP & TF

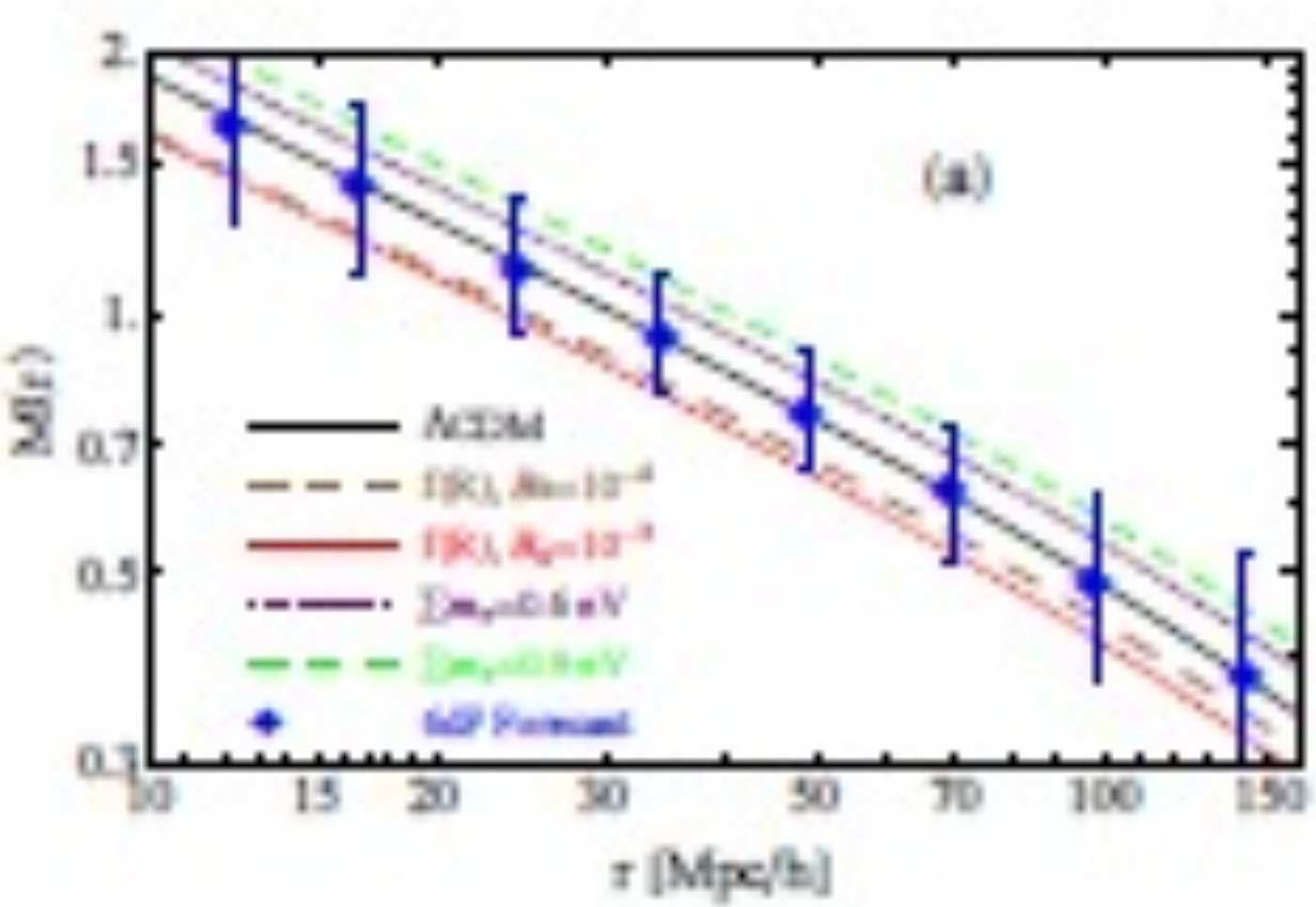
- Add SDSS data (Graves) to cover π sr of the northern hemisphere (NH)
- Enlarge the reconstruction
  - improve the incompleteness correction,
  - peculiar velocities key to improving redshift distances
- Extend the SH sample volume, using ASKAP and SkyMapper (Lagattuta)
- Extend the NH sample volume, using WNSHS and PanSTARRS
- Improve Tully-Fisher relation $v = (\sigma^4 + \Delta V^4)^{1/4}$

Dipole is reduced by correction for the individual peculiar velocities predicted by Erdogdu

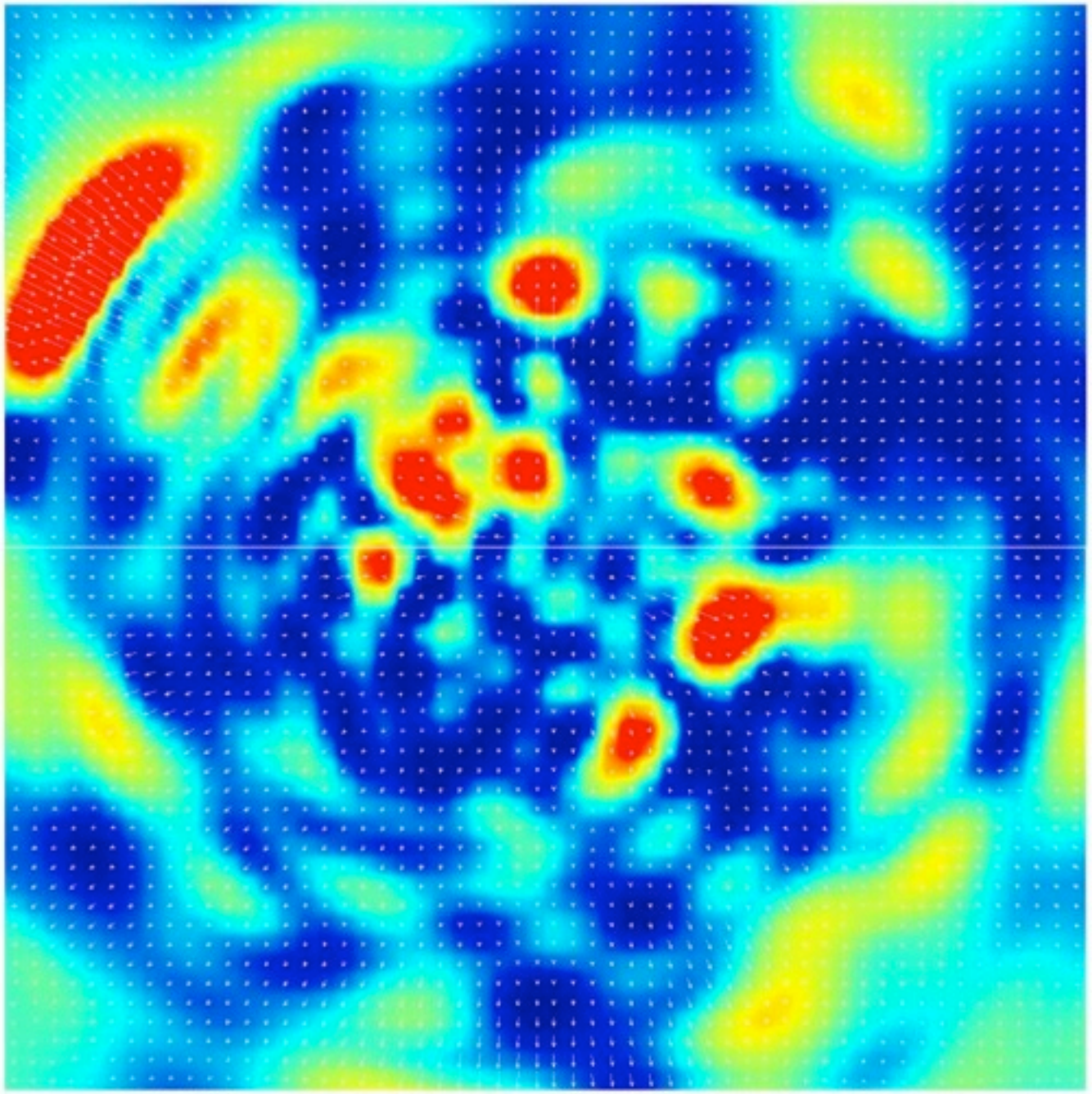




Cosmic Mach Number
Ma, Ostriker, Zhao 2011



$M = v / \sigma$




CAASTRO
ALL-SKY ASTROPHYSICS