



Figure S2. Synthetic test for starting model with varying V_p and V_p/V_s . IA1 was assigned a dV_p of 3% and $d(V_p/V_s)$ of -5.5%. IA2 was assigned a dV_p of 9% and a $d(V_p/V_s)$ of 4%. IA3 was assigned a dV_p of 4% and a $d(V_p/V_s)$ of -4%. Recovery of dV_p magnitude was as high as ~60% with vertically integrated recovery of ~36%. Recovery of $d(V_p/V_s)$ magnitude was as high as 50% with an vertically integrated recovery of ~50%.