2.2. Dynamical models

To model nongravitational perturbations we first considered the classical formulation by Marsden et al. (1973):

$$\mathbf{a}_{NG} = g(r)(A_1\hat{\mathbf{r}} + A_2\hat{\mathbf{t}} + A_3\hat{\mathbf{n}}) \quad , \quad g(r) = \alpha \left(\frac{r}{r_0}\right)^{-m} \left[1 + \left(\frac{r}{r_0}\right)^{n}\right]^{-k} \tag{1}$$

where r is the heliocentric distance, $m = 2.15$, $n = 5.093$, $k = 4.6142$, $r_0 = 2.808$ au, and α is such that $g(1 \text{ au}) = 1$. A_1, A_2, and A_3 are free parameters that give the nongravitational acceleration at 1 au in the radial-transverse-normal reference frame defined by $\hat{\mathbf{r}} = \mathbf{r}/r$, $\hat{\mathbf{t}} = \hat{\mathbf{n}} \times \hat{\mathbf{r}}$, $\hat{\mathbf{n}} = \mathbf{r} \times \mathbf{v}/|\mathbf{r} \times \mathbf{v}|$, where $\mathbf{r}$ and $\mathbf{v}$ are the heliocentric position and velocity of the comet. It is common practice to ignore the out-of-plane component, i.e., $A_3 = 0$.

As of 2014 October 3, it was clear that nongravitational perturbations were needed to fit the observed data. We computed two different orbital solutions:

- Solution 95, where A_1, A_2, and A_3 are all determined as part of the least squares orbital fit;

- Solution 97, where A_1 and A_2 are determined from the orbital fit and A_3 is set to zero.

Table 1 shows the values of the nongravitational parameters for solutions 95 and 97, and Fig. 1 shows the corresponding b-plane predictions. Solution 95 corresponds to the more conservative approach where no assumptions are