Table 1. Reference values for the inputs.

Input name	Default value/dependence/set
Gas	$\Sigma = 6.17 \cdot 10^{20}$ cm^2, $f_{\rm H} = 90\%$
Source spectrum	$\eta_S = -1$, $\alpha + \delta = 2.65$
$K(E)$ and $K_{pp}(E)$	Slab Alfvén (SA): Eqs. (5) & (6)
Cross-sections	W03 (Webber et al. 2003)
Data	B/C, dataset F†

† 31 data points from IMP7-8, Voyager 1&2, ACE, HEA0-3, Spacelab, and CREAM04

Note 1. In subsequent tables of the paper, all results obtained with the default inputs are in *italics*.

3.2. Inputs and default configuration

The inputs that we examine and vary are the following (details and references are given in Paper II, Sect. 2.4):

- gas surface density $\Sigma_{\rm ISM} = 2hn_{\rm ISM}$ and hydrogen fraction $f_{\rm H}$ (in number),
- source spectrum $Q^j(E) = q_j \beta^{\eta_S} R^{-\alpha}$ (q_j is scaled to match the measured elemental fluxes at ~ 10 GeV/n),
- spatial/momentum diffusion coefficients using different turbulence models (Schlickeiser 2002),
- production cross-sections.

The reference (default) values for these inputs are gathered in Table 1. The default diffusion coefficient K_{pp} (in momentum space) is taken from the model of minimal reacceleration by the interstellar turbulence (Osborne & Ptuskin 1988; Seo & Ptuskin 1994):

$$K_{pp} \times K = \frac{4}{3}\, V_a^2\, \frac{p^2}{\delta\,(4-\delta^2)\,(4-\delta)}, \tag{6}$$

where V_a is the Alfvénic speed in the medium.

Concerning the experimental data used to fit the B/C ratio, as in Paper II, we use the following dataset (denoted F in Paper II), which consists of 31 B/C data points (see Fig. 5 of this paper): IMP7-8 (Garcia-Munoz et al. 1987), Voyager 1&2 (Lukasiak et al. 1999), ACE-CRIS (de Nolfo et al. 2006), HEA0-3 (Engelmann et al. 1990), Spacelab (Swordy et al. 1990), and CREAM (Ahn et al. 2008).

3.3. Minimisation routine

In Papers I and II, we adapted the MCMC technique for a propagation code. This allows the PDF of the parameters to be obtained along with their statistical uncertainties. However, this technique relies on thousands of calculations for a single setting of the inputs, which is not optimal for speed. Here, we are only interested in the best-fit values, not in the PDF of the parameters. Therefore, we use the Minuit library (a CERN library), which provides minimisation routines. Instead of a few hours of distributed calculations for the MCMC technique, a few minutes on a workstation are enough to obtain the best-fit parameters.

A few configurations have been cross-checked with the MCMC technique, to ensure that the typical widths of the PDFs remain the same, whatever the input ingredients used in the calculation. This allows us, for a given propagation model calculated from different input ingredients, to compare the resulting scatter in the transport parameter values—systematic uncertainties (hereafter *SystUnc*)—to the typical statistical uncertainties (hereafter *StatUnc*) found with the MCMC technique.

4. Influence of the gas description

We start by varying the gas parameters. This is discussed for the most general class of the DM, i.e. Model III (allowing for both convection and reacceleration). For obvious reasons (see below), our conclusions also hold for Models 0, I, or II.

In 1D models, the surface density of the gas in the model corresponds to the average of the *true* gas surface density (which depends on the position in the Galaxy) over the effective diffusion volume (Taillet & Maurin 2003). This is a reasonable assumption to make for stable nuclei (see Paper II). However, the details of the volume over which to calculate this average are not straightforward. Moreover, even if a more realistic distribution of gas were to be used, the latter is not free of uncertainties. We thus allow for some uncertainty in this input. We also vary the fraction of hydrogen relative to helium.

4.1. Influence of the hydrogen fraction

In Table 2, the second and third lines (compare with the first line) show the effect of changing the hydrogen fraction in the ISM: the transport parameters are changed at most by $\sim 5\%$. There is a systematic trend for δ to decrease with smaller fractions of helium in the gas. However, the uncertainty on the hydrogen and helium fraction is not more than a few %. We therefore conclude that this has no strong impact on the derived transport parameters.

4.2. Influence of the surface density

The fourth and fifth lines show the effect of changing the surface gas density $\Sigma_{\rm ISM} = 2hn_{\rm ISM}$. Whereas it has a small impact on the diffusion slope δ, the other transport parameters are strongly affected. The change in the parameters can be understood if we look at the grammage of the DM (Maurin et al. 2002). In the purely diffusive regime, we have (e.g., Maurin et al. 2006)

$$\langle x \rangle^{pure-DM} = \frac{\Sigma_{\rm ISM} \bar{m} v L}{2K}\ , \tag{7}$$

where $\bar{m}$ is the mean mass of the ISM. Let $K_0^{\rm ref}$, $\delta^{\rm ref}$, $V_c^{\rm ref}$, and $V_a^{\rm ref}$ be the best-fit parameters obtained for a surface density of gas $\Sigma^{\rm ref}$ (first line of the Table). We remind that L is fixed here. If the surface gas density is rescaled, i.e. $\Sigma^{\rm new} = x \times \Sigma^{\rm ref}$, in order to keep the same grammage in Eq. (7), we need to have $K_0^{\rm new} = x \times K_0^{\rm ref}$. This is what we get in Table 2.

The same reasoning holds for the convective wind. In presence of a constant wind, the full expression for the grammage reads (e.g., Maurin et al. 2006)

$$\langle x \rangle^{V_c} \equiv \frac{\Sigma_{\rm ISM} \bar{m} v}{2V_c} \left[1 - e^{-\frac{V_c L}{K}}\right]\ . \tag{8}$$

With the above rescaling for $\Sigma^{\rm new}$ and $K_0^{\rm new}$, we get $V_c^{\rm new} = x \times V_c^{\rm ref}$. Again, this is recovered in Table 2.