This model represents the sound speed (squared) as a function of the angle α from a horizontal line at a specified height and latitude. The dependence of C^2 on α is as a sequence of linear segments joined by hyperbolic functions.

$$C^2 = C_o^2 + \frac{b_1}{2}(\alpha-\alpha_o) + \sum_{i=1}^{n} \delta_i \left(\frac{b_{i+1} - b_i}{2}\right) \ln \left\{ \frac{\cosh\left(\frac{\alpha-\alpha_i}{\delta_i}\right)}{\cosh\left(\frac{\alpha_i-\alpha_o}{\delta_i}\right)} \right\} + \frac{b_{n+1}}{2}(\alpha-\alpha_o)$$

$$\frac{dC^2}{dz} = b_1 + \sum_{i=1}^{n} \left(\frac{b_{i+1} - b_i}{2}\right) \left\{ \tanh\left(\frac{\alpha-\alpha_i}{\delta_i}\right) + 1 \right\} ,$$

where $b_i = (C_i^2 - C_{i-1}^2)/(\alpha_i - \alpha_{i-1})$, $\alpha = \sin^{-1}((r\cos(\theta-\theta_o) - r_o)/D)$, $D = (r_o^2 + r^2 - 2 r r_o \cos(\theta-\theta_o))^{1/2}$, $r_o = r_e + h_o$, $\theta_o = \pi/2 - \lambda_o$, r_e is the Earth radius, r is the radial coordinate of the ray point and θ is the colatitude of the ray point. Thus, δ_i is the half-thickness of a region centered at approximately α_i, in which $dC^2/d\alpha$ changes from b_i to b_{i+1}.

Specify--

    the model check for CSSPOKE = _____3.0_____ (W150)

    the input data format code = _____ (W151)

    an input data set identification number = _____ (W152)

    an 80-character description of the model with parameters:

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    the reference sound speed, C_{ref} = _____ km/s (W153)

    the height of the horizontal line, h_o = _____ km, m (W154)

    the latitude of the horizontal line, λ_o = _____ rad, deg, km (W155)

    and the profile values:

    the number of points in the profile, n = _____

    the profile:

i	z_i (km)	C_i (km/sec)	δ_i (km)

OTHER MODELS REQUIRED: Any sound-speed perturbation model. Use NPSPEED if no perturbation is desired. FUNCTION ALCOSH.