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Matthias L Youngs* (youngsm1@indiana.edu) and **David Hoff**. *Existence of weak solutions to a model for sparse, one-dimensional, non-barotropic fluids.*

We prove the global existence of weak solutions to a model for a one-dimensional, viscous, compressible, non-barotropic fluid initially occupying a general open subset of a finite measure. The fluid equations are applied only on the support of the density, understood in the sense of distributions. This support must be tracked in time and accommodation must be made for the possibly infinite number of collisions of fluid packets occurring on a possibly dense set of collision times. Our approach avoids certain nonphysical properties of solutions which are constructed as limits of solutions in which artificial mass has been inserted and, instead, gives a solution that is locally momentum conserving. Our tactic is to build and prove a reasonable theory for finitely many fluid packets and then use weak compactness to let the number of fluids go to infinity. (Received May 23, 2011)