WAITING FOR FIRST: THE EVOLUTION OF MOLECULAR OUTFLOWS

C. Codella, M. Benedettini, P. Saraceno, L. Spinoglio
Istituto di Fisica dello Spazio Interplanetario, CNR, Area di Ricerca Tor Vergata,
Via Fosso del Cavaliere 100, 00133 Roma, Italy

R. Bachiller
Observatorio Astronómico Nacional (IGN), Apartado 1143, E-28800,
Alcalá de Henares (Madrid), Spain

P. Caselli, C.M. Walmsley
Osservatorio Astrofisico di Arcetri, Largo E. Fermi 5, 50125 Firenze, Italy

B. Nisini, T. Giannini
Osservatorio Astronomico di Roma, 00040 Monteporzio Catone (Roma), Italy

We review some aspects of our research activity, based on ground-based mm-wave and ISO observations, which have been addressed in the effort to investigate the evolution of the molecular outflows associated with star forming regions. The approach given by the study of the shock chemistry has been used, observing emission due to molecular species as e.g. SiO, H_2O, H_2S, SO, SO_2. The results suggest criteria based on line profiles and abundance ratios which allow to get the evolutionary stage of the young stellar objects driving the mass loss process, and call for the study of emission due to high excitation transitions of Si-, O- and S-bearing molecules which occurs at the FIRST frequencies. The high spectral resolution given by HIFI as well as the PACS and SPIRE capability to obtain imaging spectroscopy of quite extended star forming regions represent an unique opportunity to investigate the high temperature chemistry, tracing the high excitation conditions associated with the region closely linked with the shock front.