A STUDY OF THE FRAGMENT DISPERSAL AND TRAJECTORY OF THE SAYH AL UHAYMIR 001 METEORITE SHOWER. A. V. Korochantsev[1], D. A. Sadilenko[1], M. A. Ivanova[1], C. A. Lorentz[1], and E.V. Zabalueva[1], [1]Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow 119991, Russia (korochantzev@geokhi.ru).

Sayh al Uhaymir 001 (SAUH 001) is one of Oman's largest known meteorite showers. We obtained hundreds of GPS find locations, analyzed the fragment distribution, and developed a model of the meteorite's trajectory.

SAUH 001 is a stony meteorite shower (L4/5) found March 16, 2000. More than 2670 samples weighing more than 450 kg have been collected. The collected samples may be a large portion of the total mass of the meteorite body, because the surface in this region is hard and it is likely that only a small portion of the fragments penetrated the surface. GPS locations were obtained for 748 found samples to within 0,001 minutes (~2 meters) (Fig. below). We assume that the fragments were not moved after falling.

The ground track of the meteorite was modeled as follows: (1) Determined center of mass (CM) of the fragment distribution. (2) Fitted a line, weighted for fragment mass, through the CM along the long axis of the distribution in both directions. Increasing fragment mass along track indicated a flight direction of 233°.

The fragments' mass distribution was used to model the meteorite trajectory. In the model, the distribution depends on the speed of entry into the atmosphere (v), angle to the surface (α), and breakup height (H). We developed a computer program to calculate trajectories based on the distribution. For seven mass classes, we calculated the average mass and position along the ground track. We then varied v, α and H to find solutions closest to the observed locations of the mass classes. To limit the solutions we used the relationship between v and H at the destruction air flux $A=(\rho v^2)_{max}$:

$H=-h\cdot\ln(A/v\cdot\rho_o)$, where ρ_o is the sea-level air density and h is the scale height. A was taken as $6.5\cdot10^6$, the average of several measurements for L chondrites [1]. The model yielded trajectory angle of 70-75° and breakup heights of 40 km with a meteorite velocity of 27 km/s, 30 km altitude with v=15 km/s, and 25 km with v=11 km/s. The meteorite may have broken up in several stages. For example, Pribram broke up gradually from 44 km down to 23 km altitude [2]. SAUH 001 samples show evidence of multi-stage fusion crust formation, suggesting multi-stage breakup.

Conclusion: Our model indicated the SAUH001 bolide travelled northeast to southwest, bearing 233°. Trajectory angle was ~70°, with a probable velocity of 27 km/s. Our model gave a range of breakup altitudes similar to observations of Pribram. Breakup appears to have occurred in several stages.

References: [1] Tseplekha Z. (1961) *Meteoritika* **20**, 178-184 (Russ.); [2] Tsvetkov V. I. (1985) *Thesis*, 120-122 (Russ.).