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History: On December 20th of 2008 at 22:37 hrs (local time; UT+00), witnesses from a number of locations in Morocco (Agadir, Marrakesh, Ouarzazate) observed a meteor with a W to E trajectory. According to the local newspaper, Al Massae (of December 27th), people from the high Atlas Mountains (between Marrakesh and Ouarzazate) heard a sound and felt an aftershock. Due to the high relief in this mountain region, covered with snow at this time of the year, searching for the meteorite was a difficult task. The first reports on finding meteorite pieces came a couple of weeks later from Tamdakht, a village near Ouarzazate. The largest impact pit is located near Oued Aachir (1.10 m diameter and 70 cm depth, 31°09.8’N, 7°00.9’W), 12 impact coordinates have been recorded. A strewnfield of at least 25 km long and 2 km wide has been outlined with a major axis oriented N 74°.

Physical characteristics: Total weight is presently estimated to be 100 kg. Pieces recovered as of February 15th 2009 are 30 kg, 5.1 kg, 3.8 kg, 3.69 kg, 2.4 kg, and a number of pieces below 2 kg. The largest fragment shows a nearly complete dull gray fusion crust, other pieces are 90% crusted to free of crust, often broken along pre-existing fractures. Unusual thick fusion crust, locally exceeds 1 mm.

Petrography: Abundant chondrules size is 0.1 to 1.5 mm with visible but not well-delimited outlines. Dominant olivine and orthopyroxene. Abundant chromite, rare clinopyroxene and ilmenite. Numerous pockets with chromite, plagioclase and phosphate (merrilite and CI-apatite). Kamacite, with deformed Neumann bands, and taenite, twinned troilite. Copper. Mode: metal+troilite 10%.

Mineral compositions and geochemistry: Magnetic susceptibility log X = 5.3 (10^-7 m^3/kg). Composition of Olivine is Fa18±0.5, orthopyroxene Fs16±0.3. Plagioclase Ab84±2. Chromite: Cr# =82. Kamacite with 5% Ni and taenite. Oxygen isotopes δ17O = 3.26 ‰, δ18O = 5.01 ‰, and Δ17O = 0.65‰.

Cosmogenic isotopes: Gamma ray activity measurements reveal 7Be, 22Na, 26Al, 46Sc, 54Mn, 56Co, 57Co, 59Co, 60Co with a 22Na/26Al activity ratio of 2.1 (at the time of fall).

Classification: Accordingly Tamdakht is classified as an H5 ordinary chondrite, shock intensity is S3, weathering grade W0.

Conclusion: After the Benguerir fall (22nd November 2004) [1], it is the second Moroccan fall that has been well studied and declared by a Moroccan-French scientific group, with the significant cooperation of the local and international collectors.