

Severe Hail Climatology of Turkey

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ABSTRACT

A climatology of severe hail for Turkey is being constructed using newspaper records, meteorological observations, government agencies and identical sources. Since hail is a small scale event in both spatial and temporal meanings, it is usually underreported especially over less-populated areas and during night time. Non-severe hail which is not associated with important damage is also subject to underreporting. The preliminary results of the study includes over 600 records between 1950 and 2010,

many of which does not have hail diameter, severity or time of the day information. Some of the records have photographs or videos enabling confirmation of the hail size, when some are depended upon eyewitnesses which are sometimes exaggerated (Fig 6, 7). The database is built up using the most reliable records. More than half of severe hail cases is expressed as walnut size. The largest reliably reported size of hail is 65 mm (90 grams) which is observed in Ankara in 06.05.1953, although 300-400 grams of hailstones have been observed in southeast

according to some eyewitness records published at a major national newspaper. The collected data shows that hail in Turkey usually occurs in spring and summer months. Approximately 4/5 of the hailstorms are observed during afternoon and evening hours. However, morning hours also have significant number of records. The geographical distribution is more or less homogeneous, but the Mediterranean coast, Marmara region, northeast part of the country as well as central Anatolia have in particular higher records.

Table 1: Classification of Hail

HAIL	Not Severe	Severe	
Class	Small & Medium	Large	Very Large
Diameter	< 2 cm	2 cm ~ 3.9 cm	> 4 cm
Key-words	marble, pea	walnut, chestnut, nut	egg

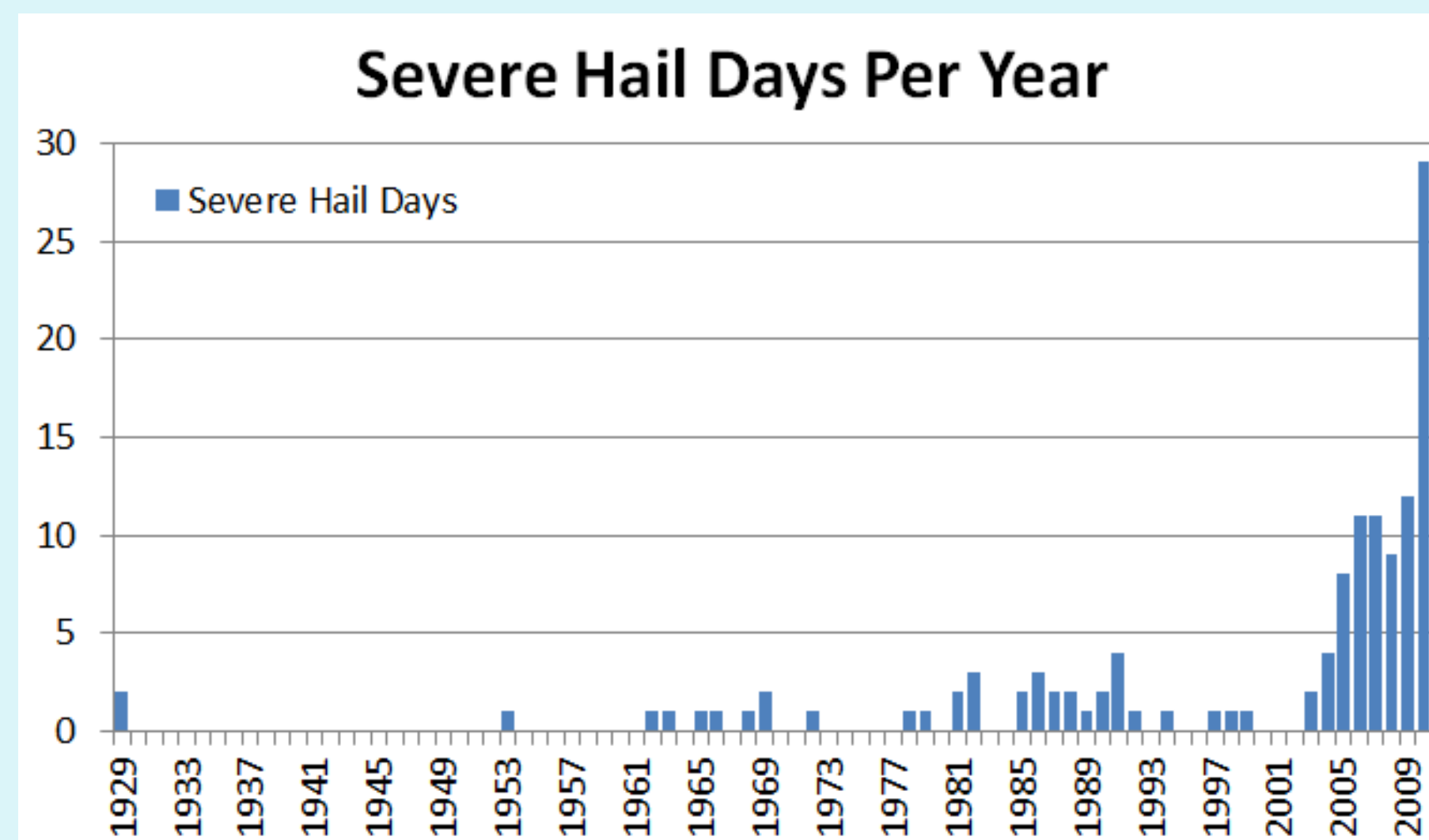


Figure 2: Severe Hail Days Per Year

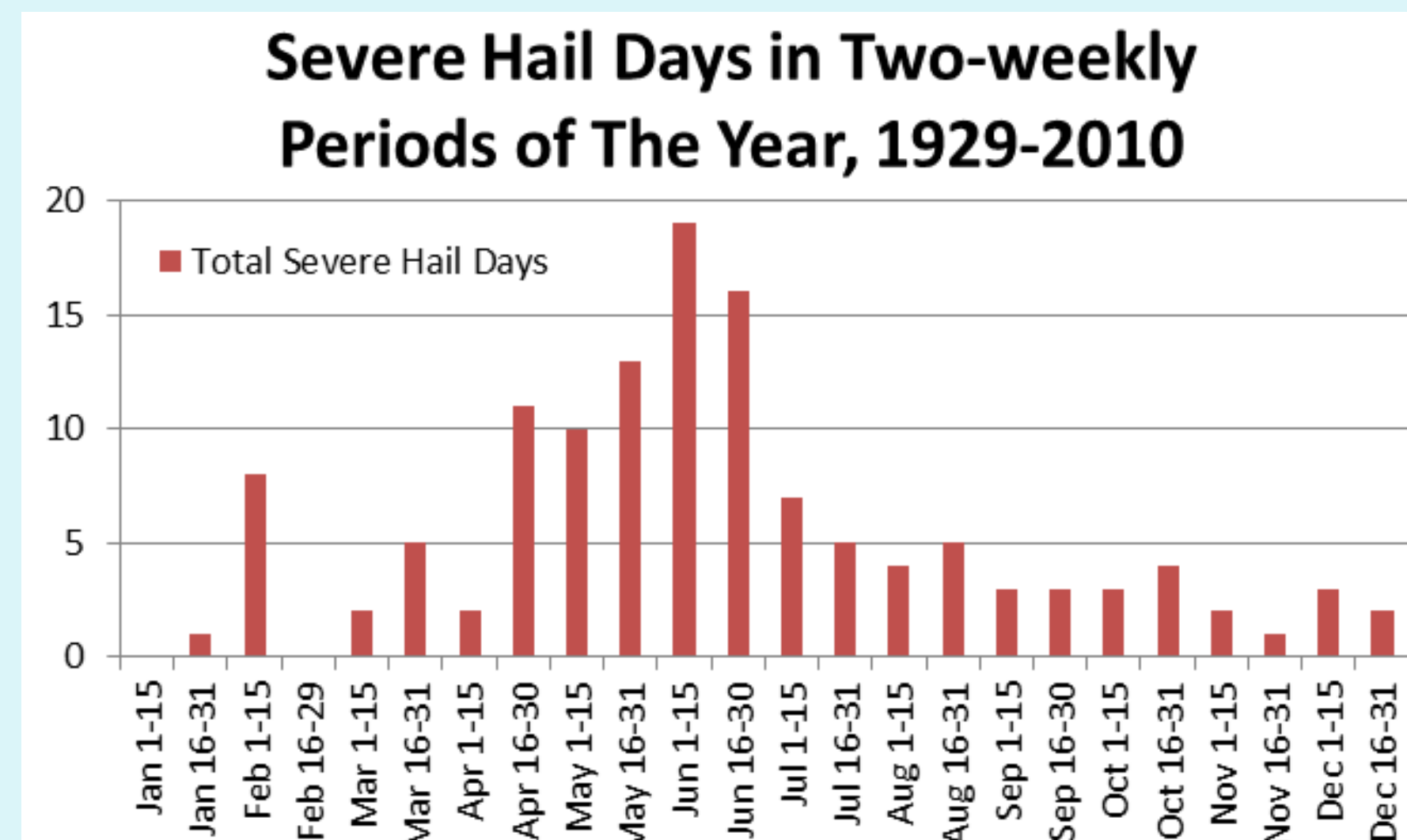


Figure 3: Severe Hail Days in Two-Week Periods of The Year between 1929-2010

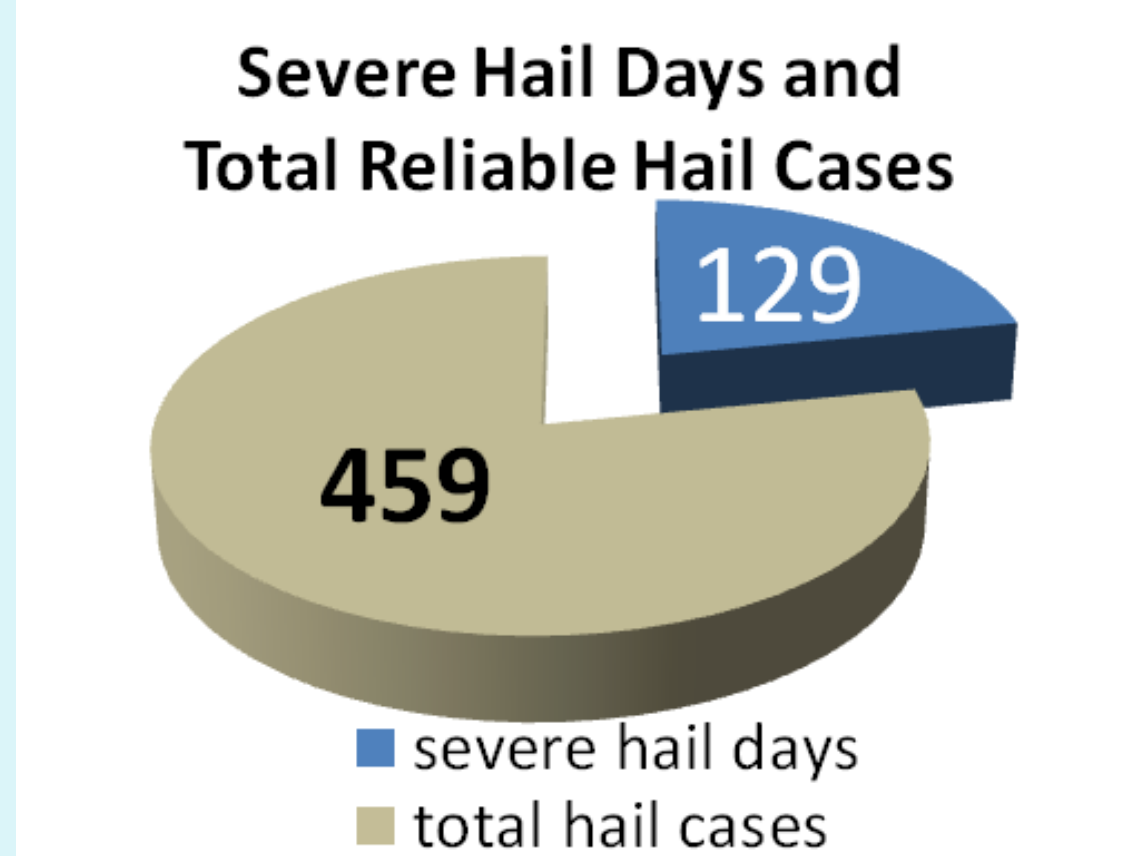


Figure 1: Severe Hail Days vs All Reliable Hail Cases

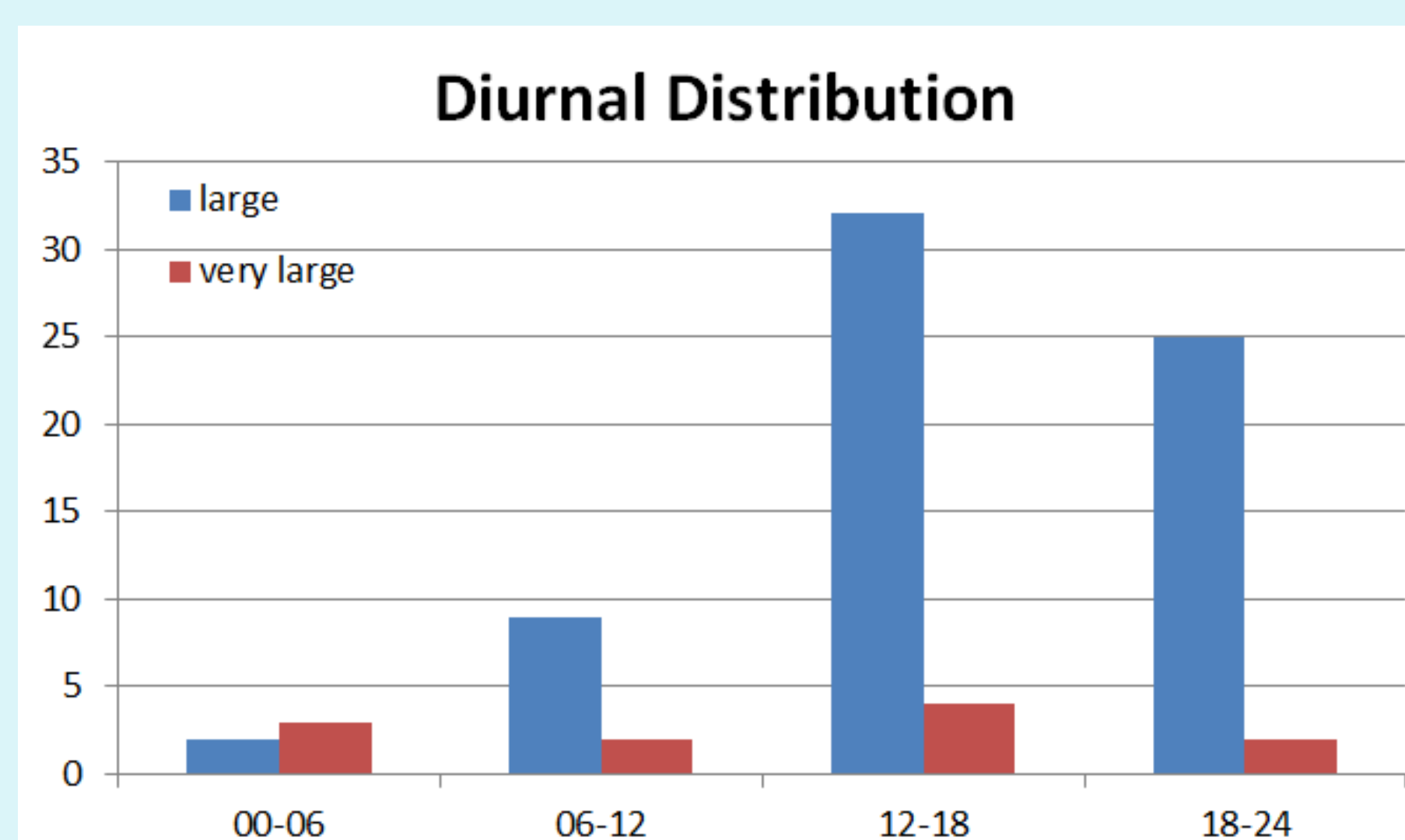


Figure 4: Diurnal Distribution of Severe Hail

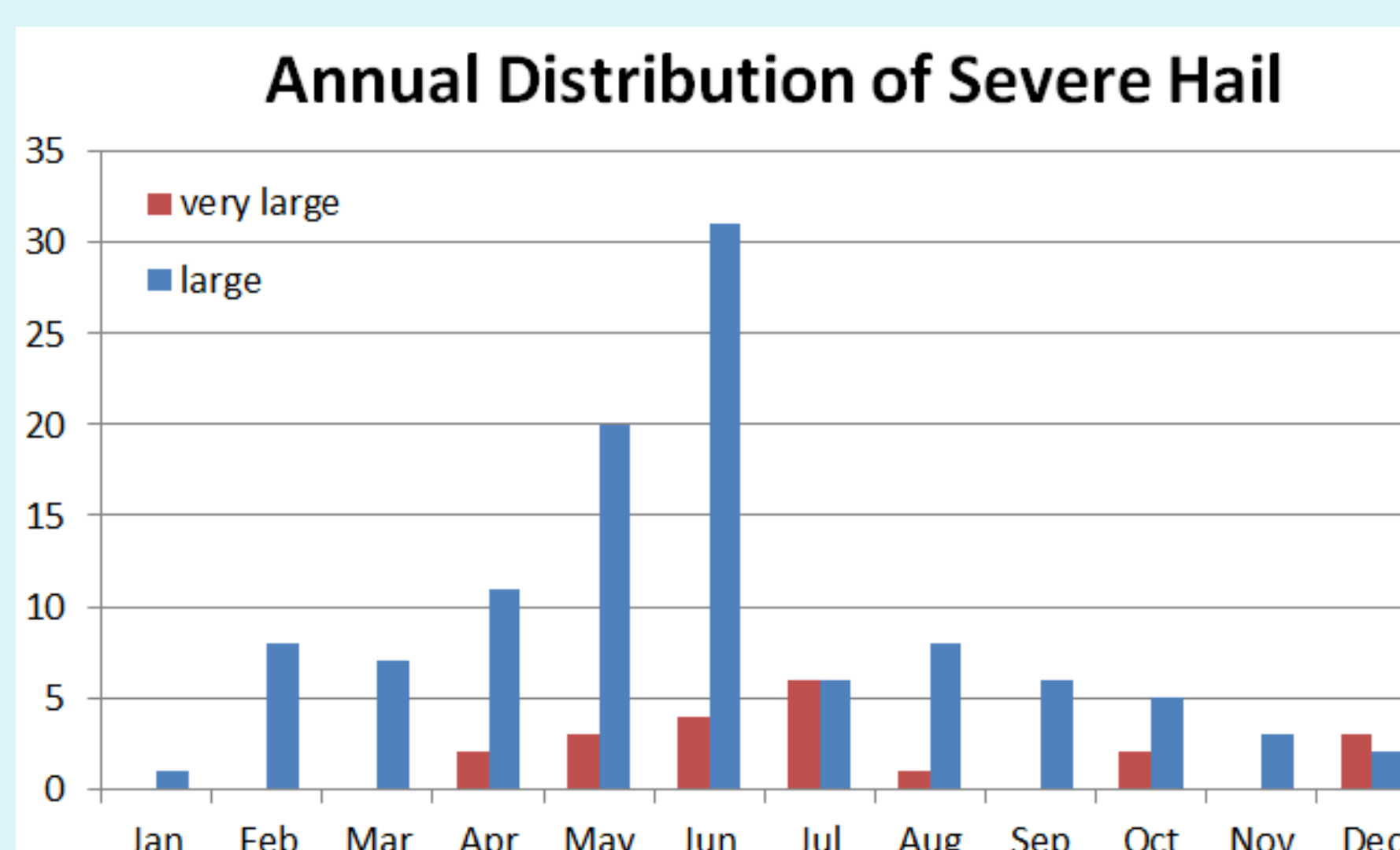


Figure 5: Annual Distribution of Severe Hail



Figure 6: Hailstones in Ankara. Photo from CHA.



Figure 7: Hailstones in Ankara. Photo from TSMS website.

DATA & CLASSIFICATION

Severity of the hail is usually defined according to its diameter (Tuovinen et al (2009), Giaiotti et al (2003), Sioutas et al (2009), Webb et al (2009)).

In this study, hail with 2 cm diameter or larger is considered as severe (Table 1). More than 4/5 of the records are from newspapers, which usually define the size with keywords like walnut, egg, etc. Major newspaper (Hurriyet, Cumhuriyet, etc.) and news agency (CHA, NTVMSNBC etc) archives are searched on internet and old copies are browsed in Beyazit State Library in Istanbul. Browsing process is still going on and different sources are being investigated. Number of severe hail days known so far is 129 (Fig 1).

RESULTS

It is obvious that most of the available records are from the last decade (Fig 2). According to the distribution of severe hail throughout the year (Fig 3), most of severe hail occurs between mid-April and mid-June in Turkey. Although large hail has a peak on June, very large hail has its peak on July, when large hail show an impressive decrease (Fig 5). Diurnal distribution of large hail shows a peak for afternoon and evening hours (Fig 4). During night time, very large hail is recorded more than large hail. Geographical distribution is more or less homogeneous (Fig 8).

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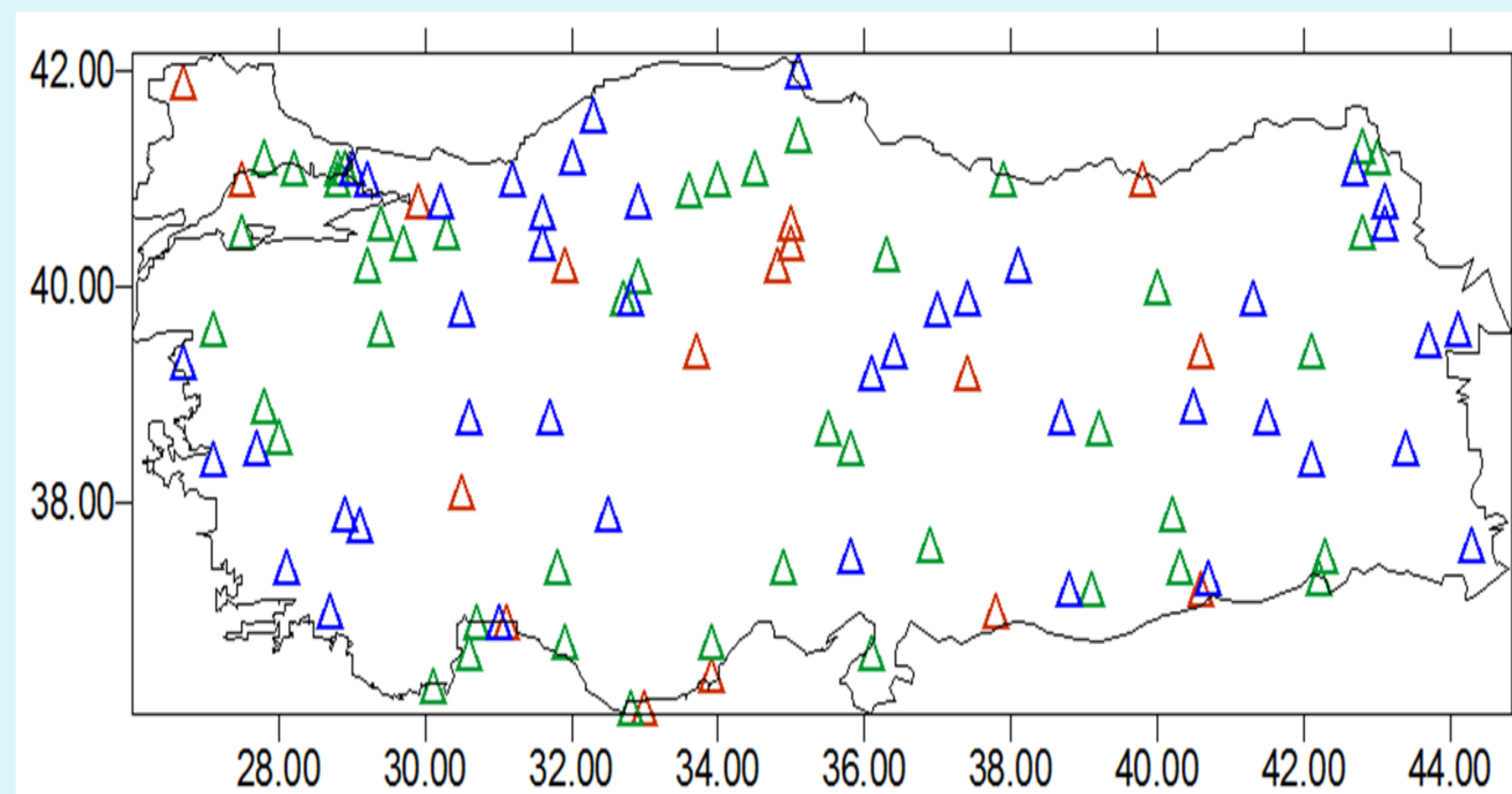


Figure 8: Geographical Distribution of Severe Hail. Blue triangles represent the large hail between 2 and 3 cm diameter size, where green represent hail with 3 to 4 cm diameter. Red triangles show very large hail occurrences, namely diameter larger than 4 cm.

SOME SIGNIFICANT HAILSTORMS

06.05.1953, Ankara: 65 mm, 90 gr. No important damage is observed.
 26.04.1963, Diyarbakir: Egg size. 35 injured and windows of about 1000 houses are broken in 9.5 minutes.
 24.10.1969, Anamur: 70 gr. A few injured, flood due to hail resulted in damage in fields.
 17.05.1982, Nizip: Egg size, some say 300-400 gr. Big damage in fields and towns.
 06.07.1987, Kangal: 150 gr. 10 small cattle died, windows broken, huge damage.
 23.10.1997, Serik. Egg size. Big damage in greenhouses and roofs.
 29.06.2007, Alaca: Egg size. Some injured.

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