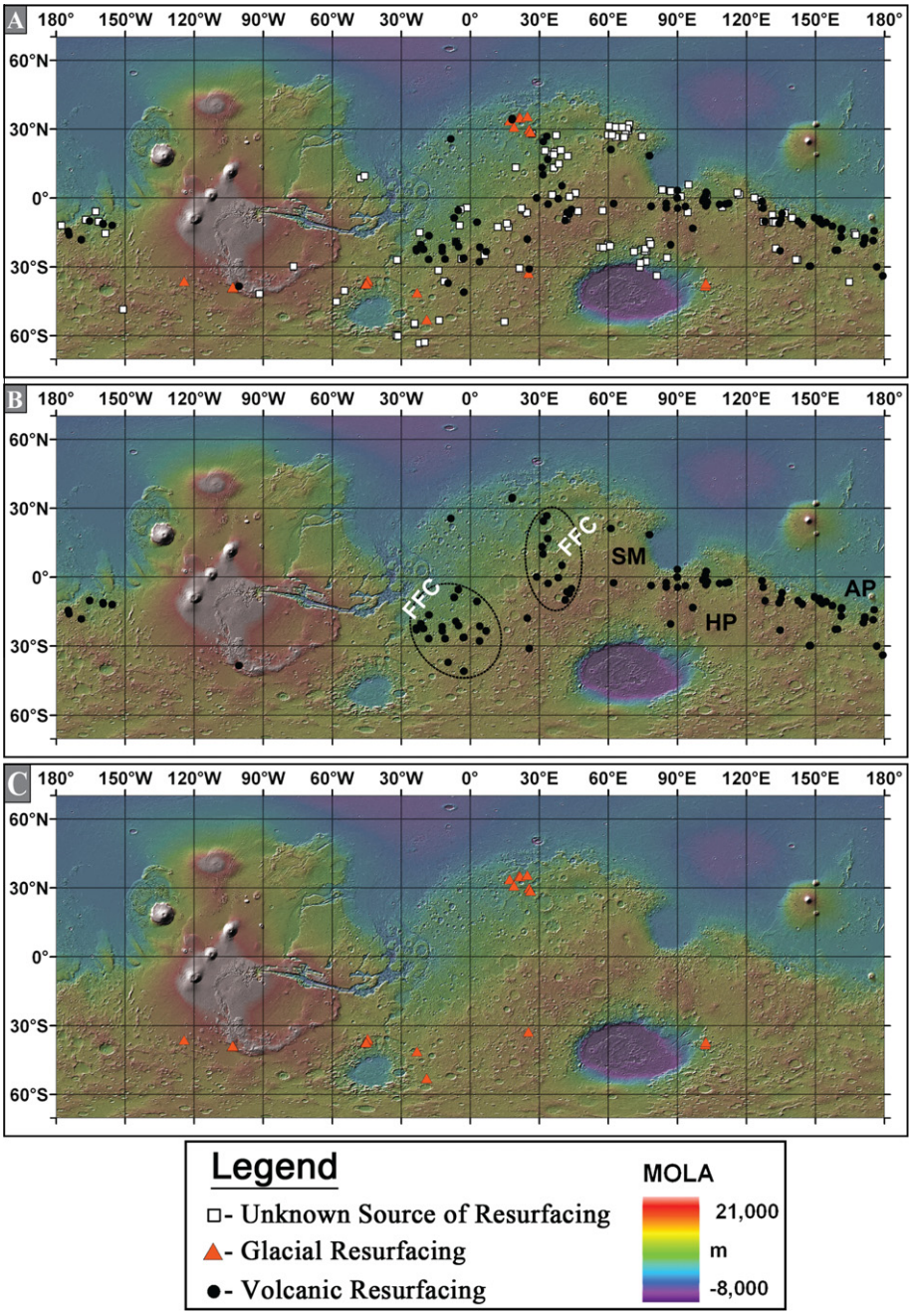

Fig. 8. Global distribution of the results of the open-basin lake resurfacing classification. Background is MOLA topography overlain on MOLA hillshade (Smith et al., 2001). Legend at bottom indicates resurfacing types. (A) Summary of all of the results for the open-basin lake resurfacing classification. (B) Global distribution of volcanically resurfaced open-basin lakes. Major volcanic sources are indicated in black text, SM = Syrtis Major, HP = Hesperia Planum and AP = Apollinaris Patera. Areas with high concentrations of volcanically resurfaced open-basin lakes but no obvious volcanic source (Arabia Terra and Margaritifer Terra) are outlined in dotted black lines. Areas of floor-fractured craters (FFCs) in Margaritifer Terra and Arabia Terra are indicated in white text. (C) Global distribution of glacially resurfaced open-basin lakes.

Quakernaat, 1969; Singer et al., 1972; Thomas et al., 1972, 1973; Jones and Bowser, 1978; Blatt et al., 1980; Hillier, 1993). As a direct example, sediments examined from the North American Great Lakes, which are comparable to the largest martian open-basin lakes in surface area and volume (Fassett and Head, 2008a), contain, on average, from ~15 to 70 wt.% clay minerals and ~0–40 wt.% carbonate minerals (e.g. Moore, 1961; Thomas, 1969; Thomas et al., 1972, 1973; Jones and Bowser, 1978).

Based solely on these terrestrial observations, one would expect that exposed sedimentary deposits observed in open-basin lakes on Mars should have a composition that includes appreciable amounts of aqueous alteration minerals and carbonates (e.g. Moore, 1961; Thomas, 1969; Muller and Quakernaat, 1969; Singer et al., 1972; Thomas et al., 1972, 1973; Jones and Bowser, 1978; Blatt et al., 1980; Hillier, 1993). These deposits would also be expected to contain chlorides and sulfates if the lacustrine systems were active for long enough to become heavily infilled and more playa-like (Eugster and Hardie, 1975, 1978; Jones and Bowser, 1978; Kelts and Hsu, 1978; Wetzel, 2001). The exact composition of these martian evaporite deposits would be expected to differ from those observed on Earth, however, due to different source water compositions (Tosca and McLennan, 2006). While recent