

Reference:

FITZNER, B. & HEINRICHS, K. (2004): Photo atlas of weathering forms on stone monuments.
<http://www.stone.rwth-aachen.de>

Group 1 - Loss of stone material



Weathering form: **Back weathering due to loss of scales (sW)**
Stone type: **Sandstone**
Location: **Monastery, Birkenfeld / Germany**
Scale: **Width of the image: 45 cm**



Weathering form: **Back weathering due to loss of scales (sW)**
Stone type: **Limestone**
Location: **Masonry, Cairo / Egypt**
Scale: **Width of the dimension stone: appr. 70 cm**



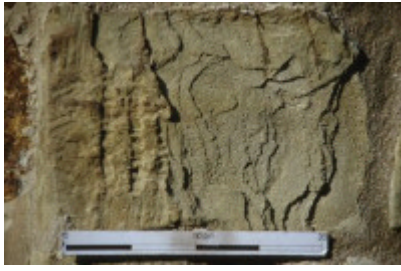
Weathering form: **Back weathering due to loss of scales (sW)**
Stone type: **Sandstone**
Location: **Khazne / Treasury, Petra / Jordan**
Scale: **Width of the image: appr. 75 cm**



Weathering form: **Back weathering due to loss of crumbs / splinters (uW)**
Stone type: **Tuff**
Location: **Minster, Neuss / Germany**
Scale: **Width of the image: appr. 80 cm**



Weathering form: **Back weathering due to loss of crumbs / splinters (uW)**
Stone type: **Limestone**
Location: **Castle, Bad Kösen / Germany**
Scale: **Height of the image: appr. 60 cm**



Weathering form: **Back weathering due to loss of stone layers dependent on stone structure (xW)**
 Stone type: **Greywacke**
 Location: **St. Lambertus Church, Monschau-Kalterherberg / Germany**
 Scale: **Width of the image: appr. 30 cm**



Weathering form: **Back weathering due to loss of stone layers dependent on stone structure (xW)**
 Stone type: **Sandstone**
 Location: **Stele, Nemrut Dag / Turkey**
 Scale: **Height of the stele : appr. 2.2 m**



Weathering form: **Back weathering due to loss of crusts (cW)**
 Stone type: **Sandstone**
 Location: **St. Georg Church, Dinkelsbühl / Germany**
 Scale: **Width of the image: appr. 30 cm**



Weathering form: **Back weathering due to loss of crusts (cW)**
 Stone type: **Sandstone**
 Location: **Castle, Hannover / Germany**
 Scale: **Height of the image: appr. 40 cm**



Weathering form: **Back weathering due to loss of undefinable stone aggregates / pieces (zW)**
 Stone type: **Limestone**
 Location: **Wall, Malta**
 Scale: **Width of the dimension stone: appr. 55 cm**



Weathering form: **Rounding / notching (Ro)**
 Stone type: **Limestone**
 Location: **Wall, Cairo / Egypt**
 Scale: **Width of the dimension stones: appr. 20 cm**



Weathering form: **Rounding / notching (Ro)**
 Stone type: **Sandstone**
 Location: **St. Johannes Church, Weinsberg / Germany**
 Scale: **Width of the grave stone: appr. 60 cm**



Weathering form: **Alveolar weathering (Ra)**
 Stone type: **Limestone**
 Location: **Citadel, Victoria - Gozo / Malta**
 Scale: **Width of the dimension stone: appr. 30 cm**



Weathering form: **Alveolar weathering (Ra)**
 Stone type: **Sandstone**
 Location: **Castle, Zwingenberg / Germany**
 Scale: **Width of the image: appr. 50 cm**



Weathering form: **Alveolar weathering (Ra)**
 Stone type: **Sandstone**
 Location: **Palace Tomb, Petra / Jordan**
 Scale: **Height of the image: appr. 1 m**



Weathering form: **Weathering out dependent on stone structure (tR)**
 Stone type: **Sandstone**
 Location: **St. Stephan Chapel, Ergersheim / Germany**
 Scale: **Height of the image: appr. 50 cm**



Weathering form: **Weathering out dependent on stone structure (tR)**
 Stone type: **Limestone**
 Location: **Cathedral, Naumburg / Germany**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Weathering out of stone components (Rk)**
 Stone type: **Limestone**
 Location: **Cathedral, Malaga / Spain**
 Scale: **Height of the image: appr. 25 cm**



Weathering form: **Weathering out of stone components (Rk)**
 Stone type: **Sandstone**
 Location: **Castle, Zwingenberg / Germany**
 Scale: **Width of the image: appr. 50 cm**



Weathering form: **Weathering out of stone components (Rk)**
 Stone type: **Limestone**
 Location: **Monastery, Dafni / Greece**
 Scale: **Width of the image: appr. 25 cm**



Weathering form: **Clearing out of stone components (Rh)**
 Stone type: **Limestone**
 Location: **Cathedral, Naumburg / Germany**
 Scale: **Width of the image: appr. 30 cm**



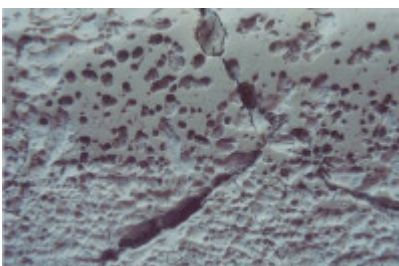
Weathering form: **Clearing out of stone components (Rh)**
 Stone type: **Conglomerate**
 Location: **Monastery, Monserrat / Spain**
 Scale: **Width of the image: appr. 50 cm**



Weathering form: **Roughening (Rr)**
 Stone type: **Marble**
 Location: **Sculpture, Venice / Italy**
 Scale: **Height of the head: appr. 30 cm**



Weathering form: **Microkarst (Rm)**
 Stone type: **Limestone**
 Location: **Head of a statue (Apollo), Nemrud Dag / Turkey**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Pitting (Rt)**
 Stone type: **Marble**
 Location: **Rialto Bridge, Venice / Italy**
 Scale: **Width of the image: appr. 20 cm**



Weathering form: **Relief due to anthropogenic impact (aR)**
 Stone type: **Sandstone**
 Location: **Karnak Temple, Luxor / Egypt**
 Scale: **Width of the image: appr. 75 cm**



Weathering form: **Break out due to anthropogenic impact (aO)**
 Stone type: **Sandstone**
 Location: **Sculptural decoration, Angkor / Cambodia**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Break out due to anthropogenic impact (aO)**
 Stone type: **Limestone**
 Location: **St. Wenzel Church, Naumburg / Germany**
 Scale: **Height of the image: appr. 4 m**



Weathering form: **Break out due to constructional cause (bO)**
 Stone type: **Sandstone**
 Location: **Cathedral, Aachen / Germany**
 Scale: **Height of the image: appr. 55 cm**



Weathering form: **Break out due to natural cause (nO)**
 Stone type: **Sandstone**
 Location: **Palace Tomb, Petra / Jordan**
 Scale: **Width of the image: appr. 12 m**



Weathering form: **Break out due to non-recognizable cause (oO)**
 Stone type: **Limestone**
 Location: **Relief, Venice / Italy**
 Scale: **Width of the image: appr. 2 m**



Weathering form: **Break out due to non-recognizable cause (oO)**
 Stone type: **Sandstone**
 Location: **Luxor Temple, Luxor / Egypt**
 Scale: **Width of the image: appr. 55 cm**



Weathering form: **Break out due to non-recognizable cause (oO)**
 Stone type: **Marble**
 Location: **Acropolis, Athens / Greece**
 Scale: **Width of the image: appr. 2 m**

Group 2 – Discoloration / Deposits



Weathering form: **Coloration (Dc)**
 Stone type: **Marble**
 Location: **Certosa, Pavia / Italy**
 Scale: **Width of the image: appr. 40 cm**



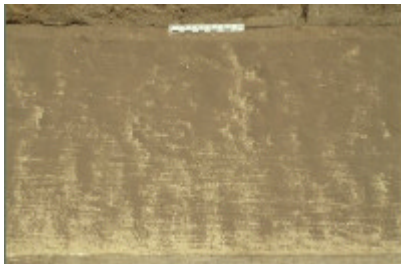
Weathering form: **Coloration (Dc)**
 Stone type: **Soapstone**
 Location: **Sculpture, Congonhas / Brazil**
 Scale: **Height of the image: appr. 15 cm**



Weathering form: **Bleaching (Db)**
 Stone type: **Limestone**
 Location: **Residential house, Aachen / Germany**
 Scale: **Width of the image: appr. 45 cm**



Weathering form: **Soiling by particles from the atmosphere (pI)**
 Stone type: **Sandstone**
 Location: **Cathedral, Zeitz / Germany**
 Scale: **Height of the image: appr. 1.5 m**



Weathering form: **Soiling by particles from the atmosphere (pI)**
 Stone type: **Limestone**
 Location: **Mosque, Cairo / Egypt**
 Scale: **Width of the image: appr. 55 cm**



Weathering form: **Soiling by particles from water (wI)**
 Stone type: **Basaltic lava, tuff**
 Location: **University, Aachen / Germany**
 Scale: **Width of the image: appr. 115 cm**



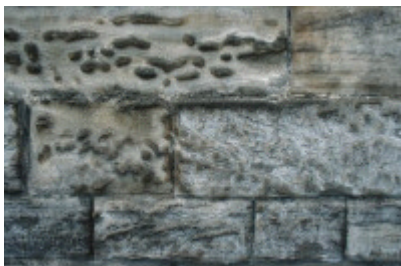
Weathering form: **Soiling by droppings (gI)**
 Stone type: **Limestone**
 Location: **Cathedral, Naumburg / Germany**
 Scale: **Height of the image: appr. 80 cm**



Weathering form: **Soiling due to anthropogenic impact (aI)**
 Stone type: **Limestone**
 Location: **Masonry, Cairo / Egypt**
 Scale: **Height of the image: appr. 1 m**



Weathering form: **Efflorescences (Ee)**
 Stone type: **Limestone**
 Location: **Mosque, Cairo / Egypt**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Efflorescences (Ee)**
 Stone type: **Sandstone**
 Location: **Masonry, Zeitz / Germany**
 Scale: **Height of the image: appr. 90 cm**



Weathering form: **Subflorescences (Ef)**
 Stone type: **Sandstone**
 Location: **St. Stephan Chapel, Ergersheim / Germany**
 Scale: **Width of the image: appr. 25 cm**



Weathering form: **Subflorescences (Ef)**
 Stone type: **Sandstone**
 Location: **Horus Temple, Edfu / Egypt**
 Scale: **Width of the image: appr. 15 cm**



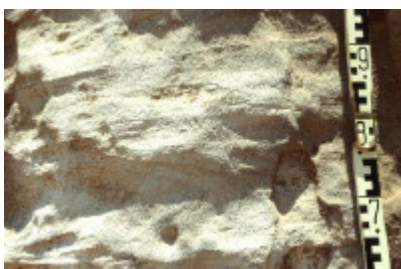
Weathering form: **Dark-colored crust tracing the surface (dkC)**
 Stone type: **Limestone**
 Location: **Cathedral, Halberstadt / Germany**
 Scale: **Width of the image: appr. 1 m**



Weathering form: **Dark-colored crust tracing the surface (dkC)**
 Stone type: **Tuff**
 Location: **Monastery, Knechtsteden / Germany**
 Scale: **Height of the image: appr. 80 cm**



Weathering form: **Dark-colored crust changing the surface (diC)**
 Stone type: **Limestone**
 Location: **Sculpture, Cathedral, Naumburg / Germany**
 Scale: **Height of the head: appr. 30 cm**



Weathering form: **Light-colored crust tracing the surface (hkC)**
 Stone type: **Sandstone**
 Location: **Ed-Der / Monastery, Petra / Jordan**
 Scale: **Height of the image: appr. 35 cm**



Weathering form: **Light-colored crust changing the surface (hiC)**
 Stone type: **Limestone**
 Location: **Mosque, Cairo / Egypt**
 Scale: **Width of the dimension stone: appr. 30 cm**



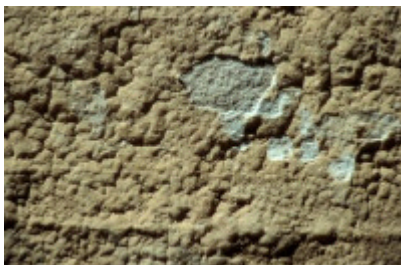
Weathering form: **Light-colored crust changing the surface (hiC)**
 Stone type: **Sandstone**
 Location: **Castle, Gelnhausen / Germany**
 Scale: **Height of the image: appr. 1.5 m**



Weathering form: **Colored crust tracing the surface (fkC)**
 Stone type: **Marble**
 Location: **Sanctuary of Demeter, Eleusis / Greece**
 Scale: **Height of the image: appr. 55 cm**



Weathering form: **Colored crust tracing the surface (fkC)**
 Stone type: **Quartzite**
 Location: **Church of Sao Francisco des Assis, Ouro Preto / Brazil**
 Scale: **Height of the image: appr. 30 cm**



Weathering form: **Colored crust changing the surface (fiC)**
 Stone type: **Sandstone**
 Location: **Tomb carved from bedrocks, Petra / Jordan**
 Scale: **Width of the image: appr. 20 cm**



Weathering form: **Microbiological colonization (Bi)**
 Stone type: **Limestone**
 Location: **Sculpture, Torcello / Italy**
 Scale: **Width of the head: appr. 20 cm**



Weathering form: **Microbiological colonization (Bi)**
 Stone type: **Sandstone**
 Location: **Castle, Haut Koenigsbourg / France**
 Scale: **Height of the image: appr. 35 cm**



Weathering form: **Microbiological colonization (Bi)**
 Stone type: **Tuff**
 Location: **Moai, Easter Island / Chile**
 Scale: **Height of the statue: appr. 5 m**



Weathering form: **Colonization by higher plants (Bh)**
 Stone type: **Sandstones**
 Location: **Temple, Angkor / Cambodia**
 Scale: **Height of the image: appr. 5 m**



Weathering form: **Colonization by higher plants (Bh)**
 Stone type: **Sandstone**
 Location: **Lion Triclinium, Petra / Jordan**
 Scale: **Height of the image: appr. 2 m**



Weathering form: **Colonization by higher plants (Bh)**
 Stone type: **Travertine**
 Location: **Wall, Meersburg / Germany**
 Scale: **Width of the image: appr. 1 m**



Weathering form: **Coloration to dark colored crust tracing the surface (Dc-dkC)**
 Stone type: **Sandstone**
 Location: **Town hall, Hamburg / Germany**
 Scale: **Height of the image: appr. 1.4 m**



Weathering form: **Coloration to colored crust tracing the surface (Dc-fkC)**
 Stone type: **Limestone**
 Location: **Cathedral, Halberstadt / Germany**
 Scale: **Width of the image: appr. 80 cm**



Weathering form: **Soiling by particles from the atmosphere to dark-colored crust tracing the surface (pI-dkC)**
 Stone type: **Limestone**
 Location: **Town hall, Aachen / Germany**
 Scale: **Height of the image: appr. 2 m**



Weathering form: **Soiling by particles from the atmosphere to dark-colored crust changing the surface (pI-diC)**
 Stone type: **Limestone**
 Location: **St. Wenzel Church, Naumburg / Germany**
 Scale: **Width of the image: appr. 25 cm**



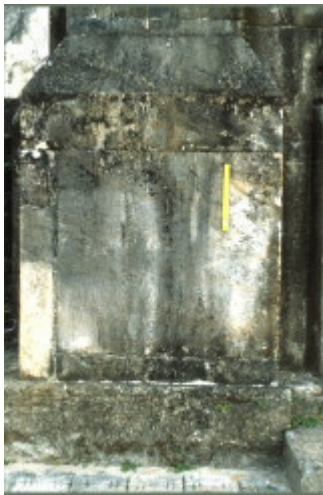
Weathering form: **Efflorescences to light-colored crust tracing the surface (Ee-hkC)**
 Stone type: **Sandstone**
 Location: **Castle, Nuremberg / Germany**
 Scale: **Width of the image: appr. 1.3 m**



Weathering form: **Efflorescences to light-colored crust tracing the surface (Ee-hkC)**
 Stone type: **Tuff**
 Location: **St. Martin Church, Düsseldorf / Germany**
 Scale: **Height of the image: appr. 50 cm**



Weathering form: **Efflorescences to light-colored crust tracing the surface (Ee-hkC)**
 Stone type: **Sandstone**
 Location: **Temple of the Winged Lion, Petra / Jordan**
 Scale: **Height of the image: appr. 1.2 m**



Weathering form: **Microbiological colonization to dark-colored crust tracing the surface (Bi-dkC)**
 Stone type: **Quartzite**
 Location: **Monastery, Caraca / Brazil**
 Scale: **Width of the image: appr. 1.3 m**



Weathering form: **Microbiological colonization to dark-colored crust tracing the surface (Bi-dkC)**
 Stone type: **Sandstone / limestone**
 Location: **Collegiate Church, Thann / France**
 Scale: **Width of the image: appr. 1 m**

Group 3 – Detachment



Weathering form: **Granular disintegration into powder (Gp)**
 Stone type: **Limestone**
 Location: **Cathedral, Cadiz / Spain**
 Scale: **Width of the image: appr. 45 cm**



Weathering form: **Granular disintegration into sand (Gs)**
 Stone type: **Sandstone**
 Location: **University, Aachen / Germany**
 Scale: **Width of the image: appr. 30 cm**



Weathering form: **Granular disintegration into sand (Gs)**
 Stone type: **Quartzite**
 Location: **Museu da Inconfidencia, Ouro Preto / Brazil**
 Scale: **Width of the image: appr. 40 cm**



Weathering form: **Granular disintegration into grus (Gg)**
 Stone type: **Granite**
 Location: **Karnak Temple, Luxor / Egypt**
 Scale: **Width of the image: appr. 30 cm**



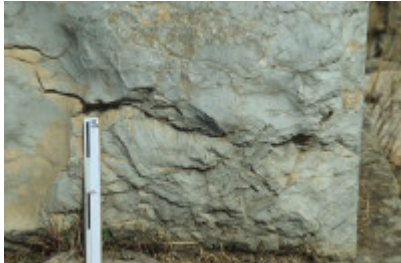
Weathering form: **Crumbling (Pu)**
 Stone type: **Limestone**
 Location: **City wall, Cairo / Egypt**
 Scale: **Width of the dimension stone: appr. 40 cm**



Weathering form: **Crumbling (Pu)**
 Stone type: **Limestone**
 Location: **Mosque, Cairo / Egypt**
 Scale: **Width of the image: appr. 40 cm**



Weathering form: **Crumbling (Pu)**
 Stone type: **Sandstone**
 Location: **Castle, Schillingsfürst / Germany**
 Scale: **Width of the image: appr. 50 cm**



Weathering form: **Splintering (Pn)**
 Stone type: **Limestone**
 Location: **Sanctuary of Demeter, Eleusis / Greece**
 Scale: **Height of the image: appr. 35 cm**



Weathering form: **Crumbling to splintering (Pu-Pn)**
 Stone type: **Quartzite**
 Location: **Town hall, Aachen / Germany**
 Scale: **Height of the image: appr. 30 cm**



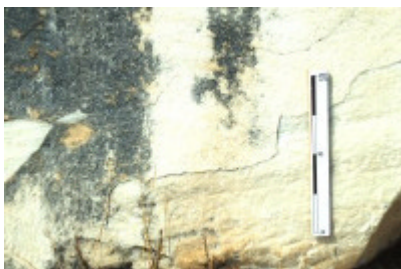
Weathering form: **Single flakes (eF)**
 Stone type: **Sandstone**
 Location: **Castle, Ludwigsburg / Germany**
 Scale: **Width of the dimension stone: appr. 60 cm**



Weathering form: **Multiple flakes (mF)**
 Stone type: **Limestone**
 Location: **Mosque, Cairo / Egypt**
 Scale: **Width of the dimension stone: appr. 45 cm**



Weathering form: **Scale due to tooling of the stone surface (qS)**
 Stone type: **Limestone**
 Location: **Pillar, Cairo, Egypt**
 Scale: **Width of the dimension stone: appr. 45 cm**



Weathering form: **Scale due to tooling of the stone surface (qS)**
 Stone type: **Marble**
 Location: **Sanctuary of Demeter, Eleusis / Greece**
 Scale: **Height of the image: appr. 35 cm**



Weathering form: **Single scale (eS)**
 Stone type: **Sandstone**
 Location: **University, Aachen / Germany**
 Scale: **Width of the dimension stone: appr. 40 cm**



Weathering form: **Single scale (eS)**
 Stone type: **Sandstone**
 Location: **Castle, Ludwigsburg / Germany**
 Scale: **Width of the image: appr. 60 cm**



Weathering form: **Multiple scales (mS)**
 Stone type: **Mudstone**
 Location: **Cheonjeon-Ri Petroglyph, Ulsan / Korea**
 Scale: **Width of the image: appr. 115 cm**



Weathering form: **Multiple scales (mS)**
 Stone type: **Sandstone**
 Location: **Monastery, Birkenfeld / Germany**
 Scale: **Width of the dimension stone: appr. 45 cm**



Weathering form: **Exfoliation (XI)**
 Stone type: **Sandstone**
 Location: **Cathedral, Zeitz / Germany**
 Scale: **Width of the dimension stone: appr. 40 cm**



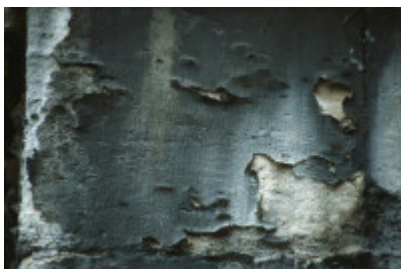
Weathering form: **Exfoliation (XI)**
 Stone type: **Sandstone**
 Location: **Castle, Heidelberg / Germany**
 Scale: **Width of the image: appr. 30 cm**



Weathering form: **Splitting up (Xv)**
 Stone type: **Sandstone**
 Location: **Church, Iphofen / Germany**
 Scale: **Height of the image: appr. 45 cm**



Weathering form: **Splitting up (Xv)**
 Stone type: **Sandstone**
 Location: **Residence, Würzburg / Germany**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Detachment of a dark-colored crust tracing the surface (dkK)**
 Stone type: **Limestone**
 Location: **Cathedral, Naumburg / Germany**
 Scale: **Width of the dimension stone: appr. 40 cm**



Weathering form: **Detachment of a dark-colored crust changing the surface (diK)**
 Stone type: **Sandstone**
 Location: **Cathedral, Magdeburg / Germany**
 Scale: **Width of the dimension stone: appr. 30 cm**



Weathering form: **Detachment of a dark-colored crust changing the surface (diK)**
 Stone type: **Limestone**
 Location: **City wall, Naumburg / Germany**
 Scale: **Width of the image: appr. 25 cm**



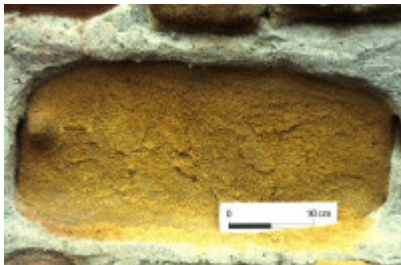
Weathering form: **Detachment of a light-colored crust changing the surface (hiK)**
 Stone type: **Limestone**
 Location: **Thorn house, Bad Kösen / Germany**
 Scale: **Width of the image: appr. 40 cm**



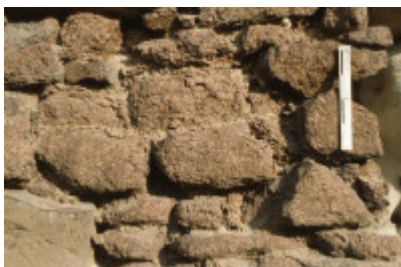
Weathering form: **Detachment of a light-colored crust changing the stone surface (hiK)**
 Stone type: **Limestone**
 Location: **El Merdani Mosque, Cairo / Egypt**
 Scale: **Width of the image: appr. 25 cm**



Weathering form: **Granular disintegration into sand to single flakes (Gs-eF)**
 Stone type: **Sandstone**
 Location: **Chapel, Ergersheim / Germany**
 Scale: **Height of the image: appr. 55 cm**



Weathering form: **Granular disintegration into sand to single flakes (Gs-eF)**
 Stone type: **Sandstone**
 Location: **Thorne house, Bad Dürkheim / Germany**
 Scale: **Width of the image: appr. 45 cm**



Weathering form: **Granular disintegration into grus to single flakes (Gg-eF)**
 Stone type: **Quartz porphyry**
 Location: **Chapel, Wettin / Germany**
 Scale: **Width of the image: appr. 85 cm**



Weathering form: **Granular disintegration into grus to single flakes (Gg-eF)**
 Stone type: **Granite**
 Location: **Sphinx Temple, Giza / Egypt**
 Scale: **Width of the dimension stone: appr. 1 m**



Weathering form: **Single flakes to crumbling (eF-Pu)**
 Stone type: **Limestone**
 Location: **Megalithic Temple of Ggantija, Gozo / Malta**
 Scale: **Width of the image: appr. 35 cm**



Weathering form: **Crumbling to single scale (Pu-eS)**
 Stone type: **Limestone**
 Location: **Slab, Giza / Egypt**
 Scale: **Width of the image: appr. 45 cm**



Weathering form: **Splintering to single scale (Pn-eS)**
 Stone type: **Limestone**
 Location: **Acropolis, Athens / Greece**
 Scale: **Width of the dimension stone: appr. 50 cm**



Weathering form: **Single flakes to single scale (eF-eS)**
 Stone type: **Sandstone**
 Location: **Cathedral, Aachen / Germany**
 Scale: **Width of the image: appr. 30 cm**



Weathering form: **Multiple flakes to multiple scales (mF-mS)**
 Stone type: **Sandstone**
 Location: **Monastery, Birkenfeld / Germany**
 Scale: **Width of the image: appr. 90 cm**



Weathering form: **Multiple flakes to multiple scales (mF-mS)**
 Stone type: **Limestone**
 Location: **Megalithic Temple of Ggantija, Gozo / Malta**
 Scale: **Width of the image: appr. 35 cm**

Group 4 – Fissures / deformation



Weathering form: **Fissures independent of stone structure (vL)**
 Stone type: **Sandstone**
 Location: **Karnak Temple, Luxor / Egypt**
 Scale: **Height of the image: appr. 70 cm**



Weathering form: **Fissures independent of stone structure (vL)**
 Stone type: **Marble**
 Location: **Agora, Athens / Greece**
 Scale: **Width of the image: appr. 55 cm**



Weathering form: **Fissures dependent on stone structure (tL)**
 Stone type: **Sandstone**
 Location: **Tomb carved from bedrocks, Petra / Jordan**
 Scale: **Width of the image: appr. 1 m**



Weathering form: **Deformation, convex (IV)**
 Stone type: **Marble**
 Location: **Old Cemetery, Bonn / Germany**
 Scale: **Height of the image: appr. 60 cm**



Weathering form: **Deformation, concave (rV)**
Stone type: **Marble**
Location: **Cemetery, Cologne / Germany**
Scale: **Height of the image: appr. 65 cm**