

# OVERVIEW OF VILLAGE DAMAGE ATLAS: KEKHVI TO TSKHINVALI, SOUTH OSSETIA, GEORGIA

Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

**Hyperlinked  
Map Sheets**

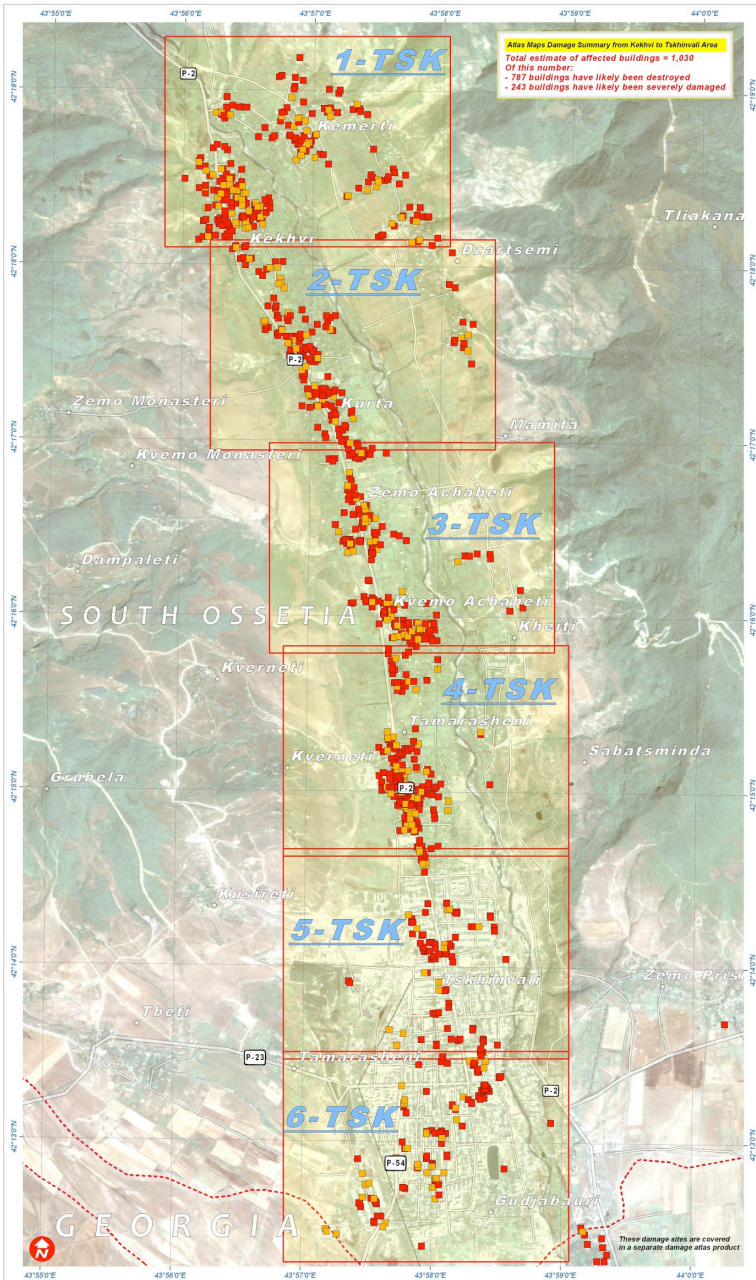
(Move PDF cursor over  
the desired atlas map sheet)

**Fire & Armed Conflict** 26 August 2008



Version 1.0

UNOSAT-2008-000147



**Analysis Description**

This atlas overview presents a satellite-based damage assessment for the affected area between Kekhvi and Tskhinali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces, August 2008. Damaged buildings have been identified with WorldView-1 & Formosat-2 satellite imagery acquired on 19 August 2008. Affected buildings have been classified either as destroyed or severely damaged by image interpretation methods. Destroyed buildings were defined either by the total collapse of the structure or where it was standing but with less than 50% of the roof still intact. Severely damaged buildings were defined as having visible structural damage to a limited portion of one wall or where a portion of the roof was damaged but with more than 50% of the roof still intact.

The estimated number of affected buildings within the mapped extent of each atlas sheet is described in a damage summary box. The estimated total number of affected buildings for the whole of the atlas series is 1,030. Of this total 787 buildings have likely been destroyed and 243 buildings have likely been severely damaged. Also marked within the atlas are buildings which were visibly burning when the satellite image was recorded on 19 August 2008.

An important preliminary finding of this satellite damage analysis is the observed heavy concentration of damages within clearly defined residential areas.

Each atlas map sheet shown in this overview is hyperlinked either to the individual maps on-line or within the PDF document. Atlas map sheets have been produced at a scale of 1:9,250 for A3 printing. Please note, this is an initial damage assessment and has not yet been independently validated on the ground. Please send any additions or corrections to UNOSAT at info@unosat.org or call the 24/7 Hotline: +41 76 487 4998.

**Map Legend**

**Transport Pts** Airport, Port  
**Transport Lines** Main Road, Secondary Road, Railroad

**Administrative**  
 International Border  
 Approximate South Ossetia Boundary

**SATELLITE DAMAGE ASSESSMENT**

Building Likely Destroyed  
 Building Likely Severely Damaged

**Map Scale for A3: 1:36,000**



**Satellite Data:** WorldView-1  
 Resolution: 50 cm  
 Imagery Date: 19 August 2008  
 Copyright: Digital Globe (2008)  
 Source: U.S. Department of State - HSI  
 Access Rules: NavView/ESLA - 2008  
 Additional Imagery: Formosat-2 (China postharvesting)  
 Imagery Copyright: NSPO 2008  
 Imagery Date: 19 August 2008  
 File Data: MODIS Aqua - Terra (NASA)  
 File Processing: U. of Maryland, NASA  
 File Dates: 7-23 August 2008  
 GIS Data: USGS, UNEP, UNOSAT  
 Damage Analysis: UNOSAT  
 Projection: Pulkovo 1995 GK Zone 3N  
 Datum: Pulkovo 1995

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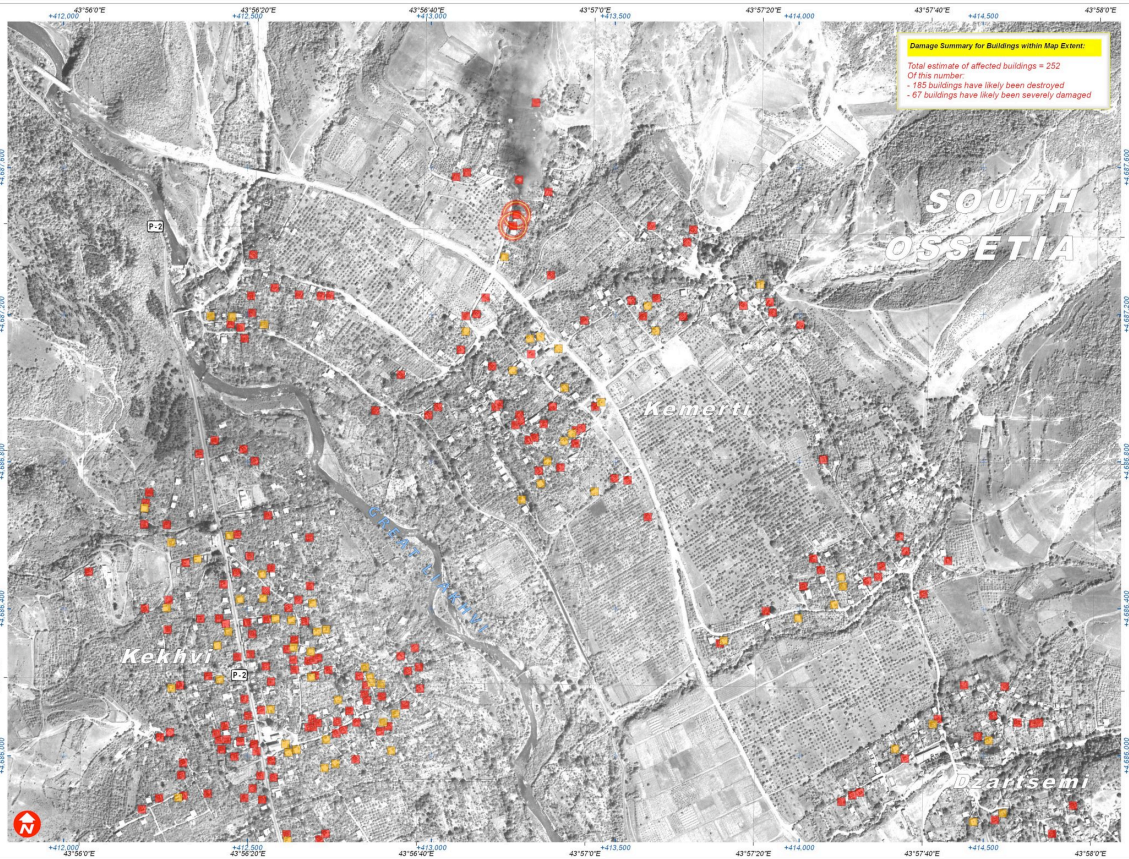
# VILLAGE DAMAGE ATLAS: FROM KEKHVI TO TSKHINVALI, SOUTH OSSETIA, GEORGIA

Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

This atlas map presents a satellite-based damage described in the damage summary box below. Affected assessment for the affected areas between Keshivi and buildings have been classified either as destroyed or severely damaged. An important preliminary finding of this conflict between Georgian and Russian military forces in satellite damage analysis is the observed heavy August 2008. Damaged buildings have been identified with concentration of damages within clearly defined residential WorldView-1 and Formosat-2 satellite imagery acquired on areas. Please note, this is an initial damage assessment 19 August 2008. The estimated number of affected and has not yet been independently validated on the buildings within the mapped extent of this atlas sheet is ground. Please send additional comments to UNOSAT.



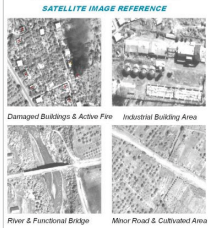
**Fire & Armed Conflict** 26 August 2008  
**ATLAS SHEET: 1-TSK**



**Damage Summary for Buildings within Map Extent:**  
 Total estimate of affected buildings = 252  
 Of this number:  
 - 185 buildings have likely been destroyed  
 - 67 buildings have likely been severely damaged



**Map Legend**  
 - - - - - Approximate South Ossetia Boundary  
**SATELLITE DAMAGE ASSESSMENT**  
 ■ Building Likely Destroyed  
 ■ Building Likely Destroyed Building on fee during sat image acquisition  
 ■ Building Likely  
 ■ Severely Damaged  
 ○ Building on fee during sat image acquisition



**Map Scale for A3: 1:9,250**

Scale: 1:9,250  
 0 10 20 30 40 50 meters

Satellite Data ..... WorldView-1  
 Resolution ..... 50 cm  
 Imagery Date ..... 19 August 2008  
 Copyright ..... Digital Globe (2008)  
 Source ..... U.S. Department of State - HII  
 Access Rules ..... NextView "EULA" - 2008  
 Additional Imagery ..... Formosat-2 (Cm) (panchromatic)  
 Imagery Copyright ..... NSPO 2008  
 Imagery Date ..... 19 August 2008  
 GIS Data ..... USGS, UNEP, UNOSAT  
 Damage Analysis ..... UNOSAT  
 Projection ..... Pulkovo 1995 GK Zone 8N  
 Datum ..... Pulkovo 1995

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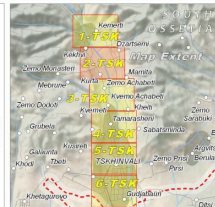
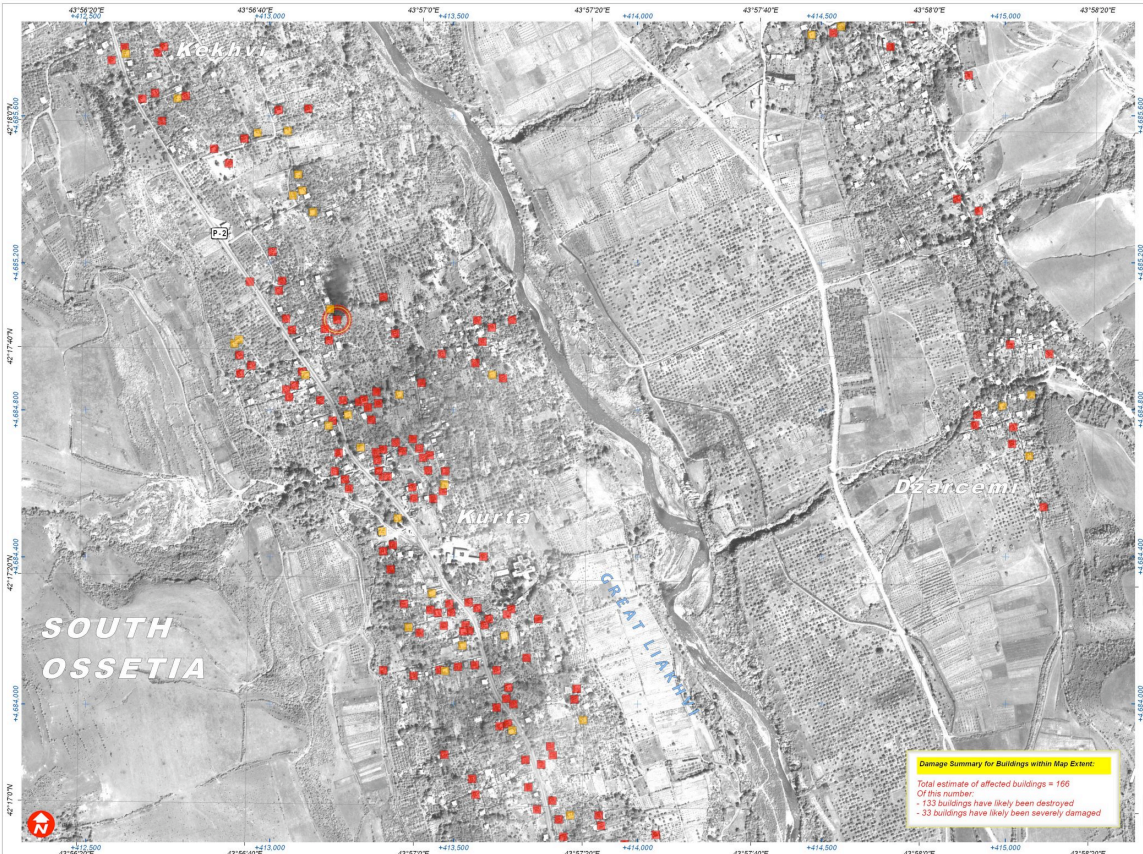
# VILLAGE DAMAGE ATLAS: FROM KEKHVI TO TSKHINVALI, SOUTH OSSETIA, GEORGIA

Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

This atlas map presents a satellite-based damage described in the damage summary box below. Affected assessment for the affected areas between Kekhvi and Tskhinvali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces in concentration of damages within clearly defined residential areas. Damaged buildings have been identified with WorldView-1 and Formosat-2 satellite imagery acquired on 19 August 2008. The estimated number of affected and severely damaged buildings is shown in the damage summary box below. Please send additional comments to UNOSAT.

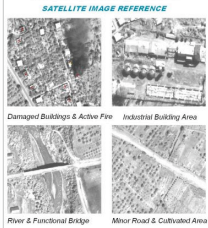


**Fire & Armed Conflict** **26 August 2008**  
**ATLAS SHEET: 2-TSK**



**Map Legend**

- Approximate South Ossetia Boundary
- SATELLITE DAMAGE ASSESSMENT**
- Building Likely Destroyed
- Building Likely Damaged
- Building on fire during sat image acquisition



**Map Scale for A3: 1:9,250**

Scale: 1:9,250

**Map Data**

- Satellite Data: WorldView-1
- Resolution: 50 cm
- Imagery Date: 19 August 2008
- Copyright: Digital Globe (2008)
- Source: U.S. Department of State - HIU
- Access Rules: NextView "EULA" - 2008
- Additional Imagery: Formosat-2 (China pan-sharpened)
- Imagery Copyright: NSPO 2008
- Imagery Date: 19 August 2008
- GIS Data: USGS, UNEP, UNOSAT
- Damage Analysis: UNOSAT
- Projection: Pulkovo 1995 GK Zone 8N
- Datum: Pulkovo 1995

**Damage Summary for Buildings within Map Extent**

Total estimate of affected buildings = 166  
 Of this number:  
 - 133 buildings have likely been destroyed  
 - 33 buildings have likely been severely damaged

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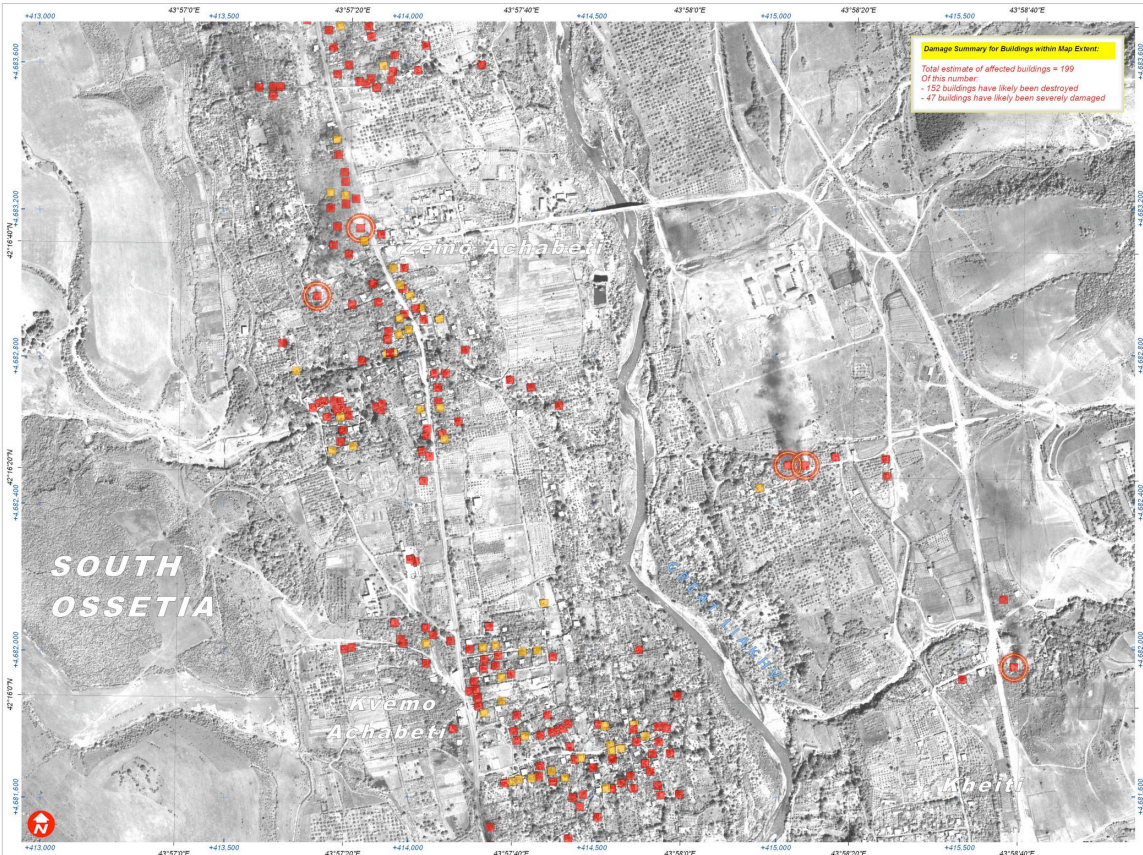
# VILLAGE DAMAGE ATLAS: FROM KEKHVI TO TSKHINVALI, SOUTH OSSETIA, GEORGIA

Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

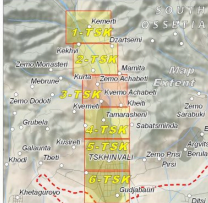
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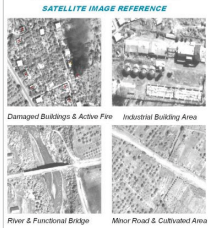
**Fire & Armed Conflict** 26 August 2008  
**ATLAS SHEET: 3-TSK**



**Damage Summary for Buildings within Map Extent:**  
 Total estimate of affected buildings = 199  
 Of this number:  
 - 152 buildings have likely been destroyed  
 - 47 buildings have likely been severely damaged



**Map Legend**  
 - - - - - Approximate South Ossetia Boundary  
**SATELLITE DAMAGE ASSESSMENT**  
 ■ Building Likely Destroyed  
 ■ Building Likely Severely Damaged  
 ○ Building on fire during sat image acquisition



**Map Scale for A3: 1:9,250**

Scale bar: 0 10 20 30 40 50 meters

Satellite Data ..... WorldView-1  
 Resolution ..... 30 cm  
 Imagery Date ..... 19 August 2008  
 Copyright ..... Digital Globe (2008)  
 Source ..... U.S. Department of State - HII  
 Access Rules ..... NextView "EULA" 2008  
 Additional Imagery ..... Formosat-2 (China panahpeneh)  
 Imagery Copyright ..... NSPO 2008  
 Imagery Date ..... 19 August 2008  
 GIS Data ..... USGS, UNEP, UNOSAT  
 Damage Analysis ..... UNOSAT  
 Projection ..... Pulkovo 1995 GK Zone 8N  
 Datum ..... Pulkovo 1995

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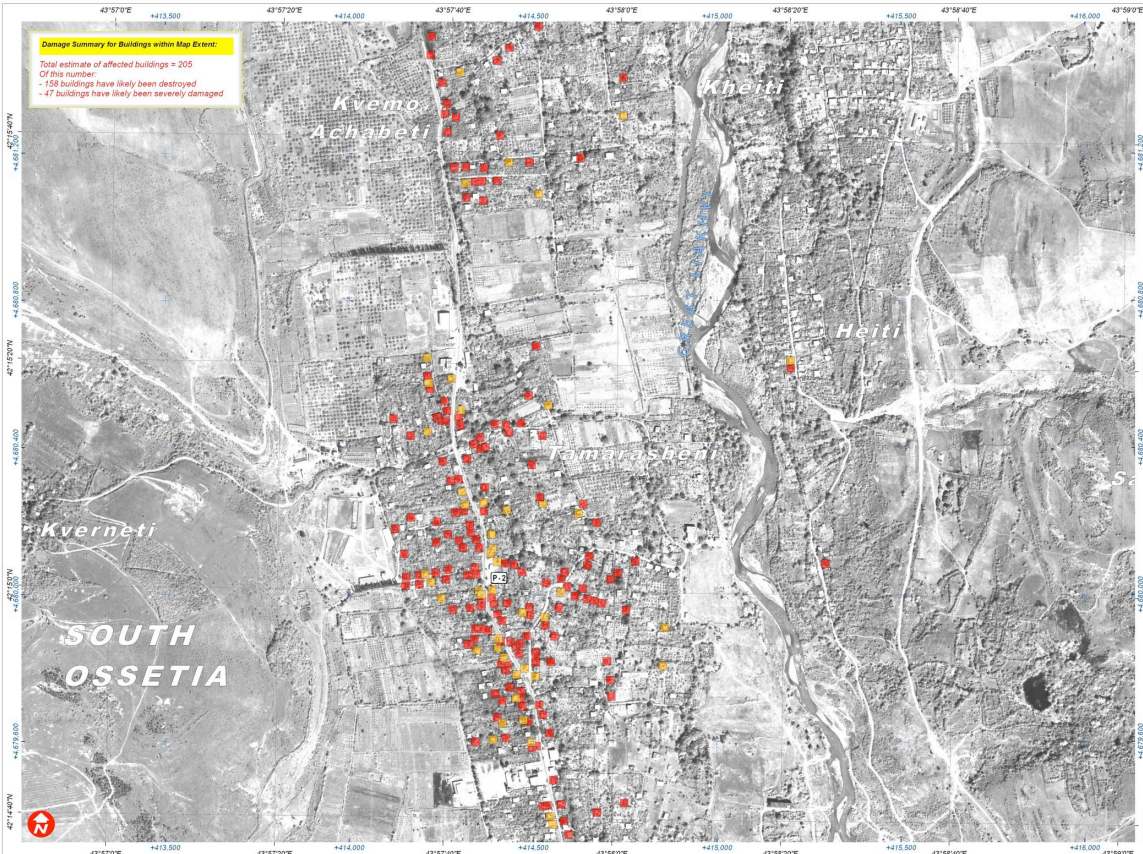
# VILLAGE DAMAGE ATLAS: FROM KEKHVI TO TSKHINVALI, SOUTH OSSETIA, GEORGIA

Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

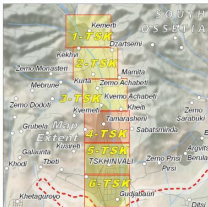
This atlas map presents a satellite-based damage assessment for the affected areas between Kekhvi and Tskhinvali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces in August 2008. Damaged buildings have been identified with WorldView-1 and Formosat-2 satellite imagery acquired on 19 August 2008. The estimated number of affected buildings within the mapped extent of this atlas sheet is provided in the damage summary box below. Affected assessment for the affected areas between Kekhvi and Tskhinvali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces in August 2008. Damaged buildings have been identified with WorldView-1 and Formosat-2 satellite imagery acquired on 19 August 2008. The estimated number of affected buildings within the mapped extent of this atlas sheet is provided in the damage summary box below. Affected assessment for the affected areas between Kekhvi and Tskhinvali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces in August 2008. Damaged buildings have been identified with WorldView-1 and Formosat-2 satellite imagery acquired on 19 August 2008. The estimated number of affected buildings within the mapped extent of this atlas sheet is provided in the damage summary box below.



**Fire & Armed Conflict** 26 August 2008  
**ATLAS SHEET: 4-TSK**

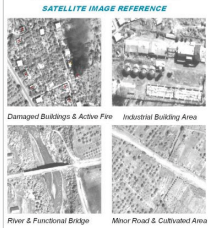


**Damage Summary for Buildings within Map Extent:**  
 Total estimate of affected buildings = 205  
 Of this number:  
 - 158 buildings have likely been destroyed  
 - 47 buildings have likely been severely damaged



**Map Legend**

- Approximate South Ossetia Boundary
- SATELLITE DAMAGE ASSESSMENT**
- Building Likely Destroyed
- Building Likely Severely Damaged
- Building on fire during sat image acquisition



**Map Scale for A3: 1:9,250**

Scale bar: 0 10 20 30 40 50 meters

Satellite Data ..... WorldView-1  
 Resolution ..... 50 cm  
 Imagery Date ..... 19 August 2008  
 Copyright ..... Digital Globe (2008)  
 Source ..... U.S. Department of State - HIIU  
 Access Rules ..... NextView "EULA" - 2008  
 Additional Imagery ..... Formosat-2 (3m pan/sharpened)  
 Imagery Copyright ..... NSPO 2008  
 Imagery Date ..... 19 August 2008  
 GIS Data ..... USGS, UNEP, UNOSAT  
 Damage Analysis ..... UNOSAT  
 Projection ..... Pulkovo 1995 GK Zone 8N  
 Datum ..... Pulkovo 1995

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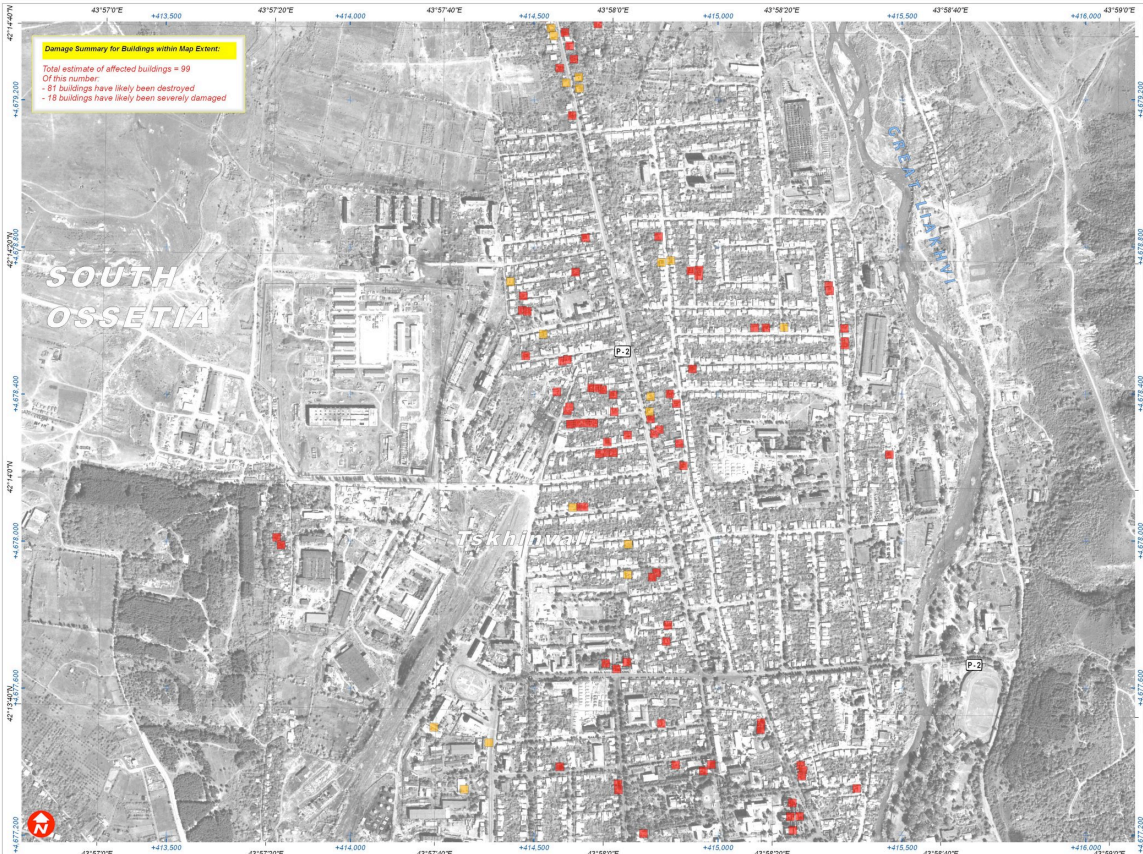
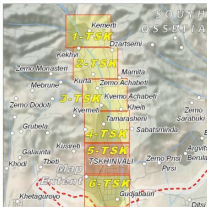
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Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

This atlas map presents a satellite-based damage assessment for the affected areas between Kekhvi and Tskhinvali, South Ossetia, Georgia following the armed conflict between Georgian and Russian military forces in satellite damage analysis is the observed heavy concentration of damages within clearly defined residential areas. Please note, this is an initial damage assessment. The estimated number of affected buildings within the mapped extent of this atlas sheet is on the ground. Please send additional comments to UNOSAT.



**Fire & Armed Conflict** 26 August 2008  
**ATLAS SHEET: 5-TSK**



**Map Legend**

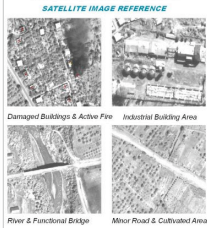
----- Approximate South Ossetia Boundary

**SATELLITE DAMAGE ASSESSMENT**

■ Building Likely Destroyed

■ Building Likely Severely Damaged

○ Building on fire during sat image acquisition



**Map Scale for A3: 1:9,250**

0 10 20 30 40 50 meters

Satellite Data ..... WorldView-1  
 Resolution ..... 50  
 Imagery Date ..... 19 August 2008  
 Copyright ..... Digital Globe (2008)  
 Source ..... U.S. Department of State - HII  
 Access Rules ..... NextView "EULA" 2008  
 Additional Imagery ..... Formosat-2 (tm pan-sharpened)  
 Imagery Copyright ..... NSPO 2008  
 Imagery Date ..... 19 August 2008  
 GIS Data ..... USGS, UNEP, UNOSAT  
 Damage Analysis ..... UNOSAT  
 Projection ..... Pulkovo 1995 GK Zone 8N  
 Datum ..... Pulkovo 1995

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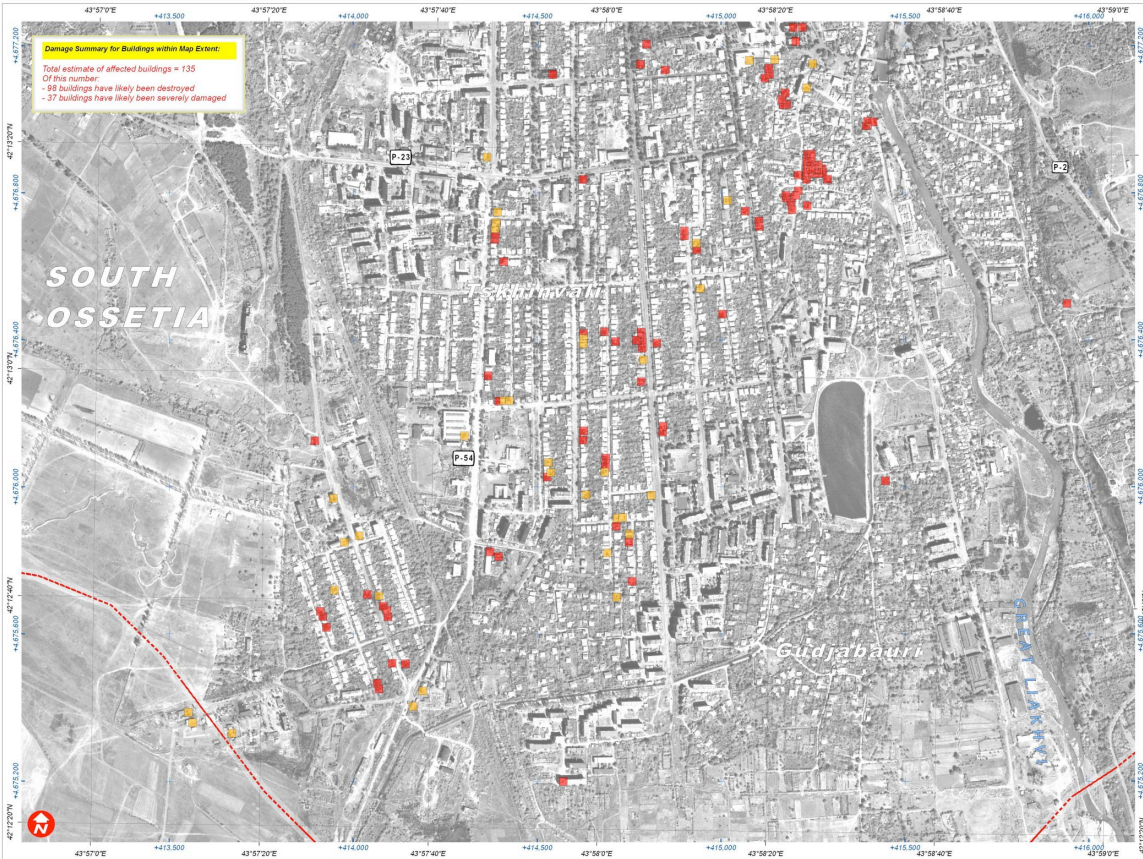
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Damage Assessment with WorldView-1 & Formosat-2 Satellite Imagery Recorded on 19 August 2008

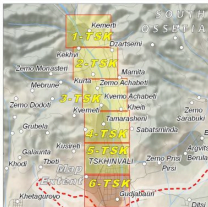
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**Fire & Armed Conflict** 26 August 2008  
**ATLAS SHEET: 6-TSK**



**Damage Summary for Buildings within Map Extent:**  
 Total estimate of affected buildings = 135  
 Of this number:  
 - 98 buildings have likely been destroyed  
 - 37 buildings have likely been severely damaged



**Map Legend**

----- Approximate South Ossetia Boundary

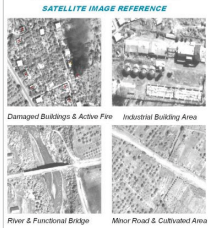
**SATELLITE DAMAGE ASSESSMENT**

■ Building Likely Destroyed

■ Building Likely Damaged

■ Building Severely Damaged

○ Building on fire during sat image acquisition



**Map Scale for A3: 1:9,250**

0 10 20 30 40 50 meters

Satellite Data ..... WorldView-1  
 Resolution ..... 50 cm  
 Imagery Date ..... 19 August 2008  
 Copyright ..... Digital Globe (2008)  
 Source ..... U.S. Department of State - HIU  
 Access Rules ..... NextView "EULA" - 2008  
 Additional Imagery ..... Formosat-2 (China pan-sharpened)  
 Imagery Copyright ..... NSPO 2008  
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