A person is standing on a beach, looking out at the ocean. The background shows several palm trees and a hazy sky. The person is wearing a light-colored shirt and dark pants. The overall scene is a coastal landscape.

RAPID SURVEY ON TSUNAMI JAWA 17 JULY 2006

**9-21 July 2006
BPDP-BPPT & ITS**

Widjo Kongko, Suranto, Chaeroni, Aprijanto, Zikra, Sujantoko

Survey Route



- 38 GPS Waypoints Record
- 10 Transects of Ground Profile
- 20 Points of Flowdepth

GPS Record

Wapoints Record

Grid Lat/Lon hddd mm' ss.s"
Datum WGS 84

Header	Description	Position	Remark	Flowdepth (cm)	Water direction (deg)
Waypoint 821	19-JUL-06 12:50:08PM	S8 01 27.5 E110 20 08.1	Max tsunami r.up (Hz) at parang endok		
Waypoint 822	19-JUL-06 12:59:08PM	S8 01 29.8 E110 20 07.1	Tsunami deposit 2 cm at parang endok	90	20
Waypoint 823	19-JUL-06 1:22:55PM	S8 01 33.9 E110 20 06.7	Watermark on the wall at parang endok	155	
Waypoint 824	19-JUL-06 1:27:04PM	S8 01 36.6 E110 20 06.0	Coastline at parang endok		
Waypoint 825	19-JUL-06 1:39:49PM	S8 01 33.3 E110 20 06.2	Tsunami deposit 5 cm at parang endok		
Waypoint 826	19-JUL-06 2:32:46PM	S8 01 03.0 E110 18 13.9	Coastline at Parang Kusuma-Depok		
Waypoint 827	19-JUL-06 2:43:59PM	S8 01 00.3 E110 18 14.2	Max tsunami r.up (Hz) at Prg Kusuma-Depok		340
Waypoint 828	19-JUL-06 5:19:22PM	S7 51 15.4 E109 54 48.3	Watermark on the wall at Prg Kusuma-Depok/Tsunami deposit 17 cm	28	
Waypoint 829	19-JUL-06 5:30:22PM	S7 51 18.4 E109 54 47.3	Coastline at Keburuhan Purworejo		315
Waypoint 830	20-JUL-06 9:20:46AM	S7 45 23.2 E109 28 15.9	Watermark on the wall at Suwuk Kebumen/Tsunami deposit <0.5cm	36	
Waypoint 831	20-JUL-06 9:34:24AM	S7 45 24.5 E109 28 13.9	Debris on Waru tree at Suwuk Kebumen	110	
Waypoint 832	20-JUL-06 9:53:54AM	S7 45 27.7 E109 28 13.2	Watermark on the wall at Suwuk Kebumen	95	
Waypoint 833	20-JUL-06 10:03:00AM	S7 45 32.5 E109 28 10.9	Coastline at Suwuk Kebumen		30
Waypoint 834	20-JUL-06 10:49:07AM	S7 45 22.8 E109 28 16.0	Max tsunami r.up (Hz) at Suwuk Kebumen (approx 350 m from coastline)		
Waypoint 835	20-JUL-06 12:14:41PM	S7 43 24.8 E109 23 41.7	Max tsunami r.up (Hz) at Ayah Kebumen		
Waypoint 836	20-JUL-06 12:27:32PM	S7 43 25.2 E109 23 40.7	Watermark on the wall at Ayah Kebumen/Tsunami deposit 3 cm	40	40
Waypoint 837	20-JUL-06 2:04:23PM	S7 43 27.5 E109 23 38.8	Watermark on the wall ar Ayah Kebumen/Tsunami deposit 4.5 cm	40	
Waypoint 838	20-JUL-06 2:09:43PM	S7 43 29.8 E109 23 36.0	Coastline at Ayah Kebumen		
Waypoint 839	20-JUL-06 3:56:42PM	S7 41 55.8 E109 15 53.3	Coastline at Widarapayung Adipala Cilacap		
Waypoint 840	20-JUL-06 4:59:58PM	S7 41 45.5 E109 15 51.3	Watermark on the wall at Widarapayung Adipala Cilacap	33	
Waypoint 841	21-JUL-06 7:20:51AM	S7 41 24.2 E109 08 34.6	Coastline at Bunton Adipala Cilacap		
Waypoint 842	21-JUL-06 8:03:46AM	S7 41 14.9 E109 08 29.2	Watermark on the wall at Bunton Adipala Cilacap	10	
Waypoint 843	21-JUL-06 8:11:23AM	S7 41 16.1 E109 08 33.6	Debris on Pandan Tree at Bunton Adipala Cilacap	75	
Waypoint 844	21-JUL-06 8:23:45AM	S7 41 11.6 E109 08 36.8	Debris on th tree at Bunton Adipala Cilacap	70	
Waypoint 845	21-JUL-06 8:26:34AM	S7 41 09.4 E109 08 36.9	Max tsunami r.up at Bunton Adipala Cilacap		
Waypoint 846	21-JUL-06 2:57:13PM	S7 41 00.9 E108 36 41.7	Debris on the Fence at Cikembulan Ciamis	130	
Waypoint 847	21-JUL-06 3:19:49PM	S7 41 03.6 E108 36 45.4	Coastline at Cikembulan transect 1 Ciamis		5
Waypoint 848	21-JUL-06 3:34:46PM	S7 40 57.8 E108 36 46.2	Watermark on the wall at Cikembulan transect 1 Ciamis	122	
Waypoint 849	21-JUL-06 3:51:36PM	S7 40 53.5 E108 36 46.7	Watermark on the wall at Cikembulan transect 1 Ciamis	90	
Waypoint 850	21-JUL-06 4:00:25PM	S7 40 46.6 E108 36 47.0	Max tsunami r.up at Cikembulan transect 1 Ciamis		
Waypoint 851	21-JUL-06 4:38:04PM	S7 41 06.5 E108 37 25.9	Coastline at Cikembulan transect 2 Ciamis		10
Waypoint 852	21-JUL-06 4:48:57PM	S7 40 59.5 E108 37 26.4	Watermark on the wall at Cikembulan transect 2 Ciamis	108	
Waypoint 853	21-JUL-06 4:59:48PM	S7 40 53.1 E108 37 28.6	River that tsunami r.up flow in		
Waypoint 854	21-JUL-06 5:23:29PM	S7 41 36.0 E108 39 00.2	Coastline at Pengandaran transect 1 Ciamis		30
Waypoint 855	21-JUL-06 5:29:05PM	S7 41 32.6 E108 39 01.9	Watermark on the wall at Pengandaran transect 1 Ciamis	110	
Waypoint 856	21-JUL-06 5:45:50PM	S7 42 01.0 E108 39 20.4	Coastline at Pengandaran transect 2 Ciamsi		30
Waypoint 857	21-JUL-06 5:52:21PM	S7 42 00.4 E108 39 23.0	Watermark in the wall at Pengandaran transect 2 Ciamis	70	
Waypoint 858	21-JUL-06 5:54:27PM	S7 42 00.4 E108 39 23.8	Watermark in the wall at Pengandaran transect 2 Ciamis	110	

Parang Endok DIY



Damaged houses & farmfield



Budi, ds. Mancingan Prg Endok :
 -No shaking, only heard explosions before tsunami
 -Receding wave 50-100m
 -3-4 waves came after 30-40 min from earthquake time



Flowdepth 90 cm



Flowdepth less than 150 cm
 Wave direction 20 deg



Tsunami Deposit 5 cm



Tsunami Deposit 2 cm



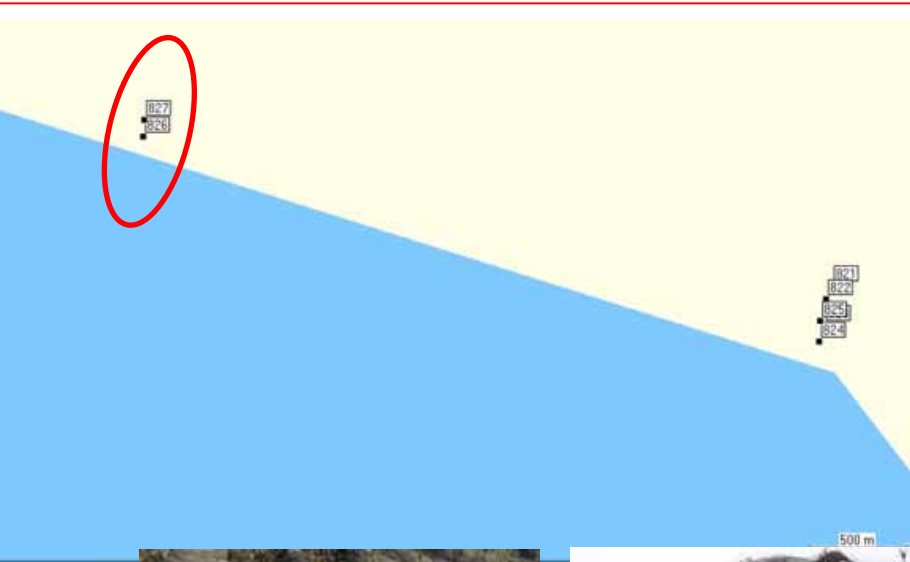
Flowdepth 78 cm



Damaged Shelter

NO TRANSECT

Parang Kusumo-Depok DIY



Wave Direction by Debris 340deg



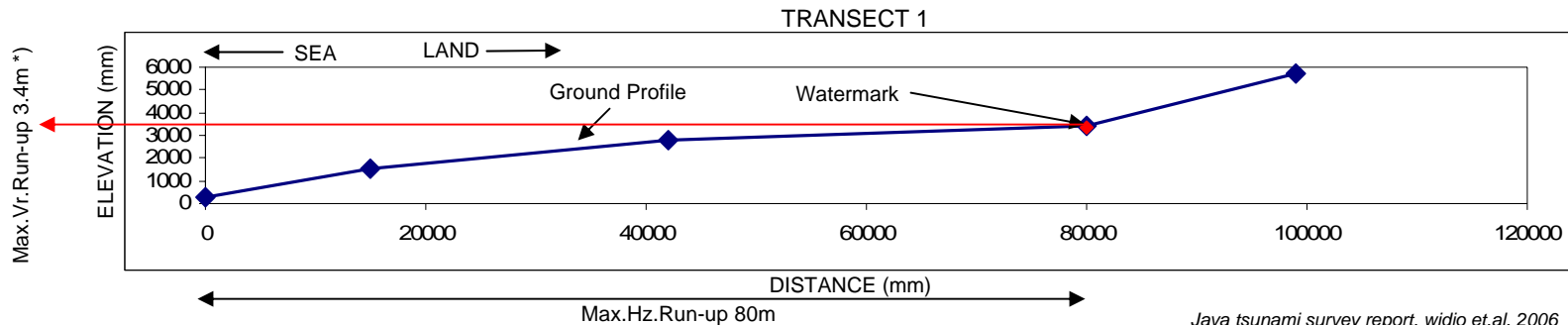
Sandune Ripple by Wind



Max Debris of Tsunami

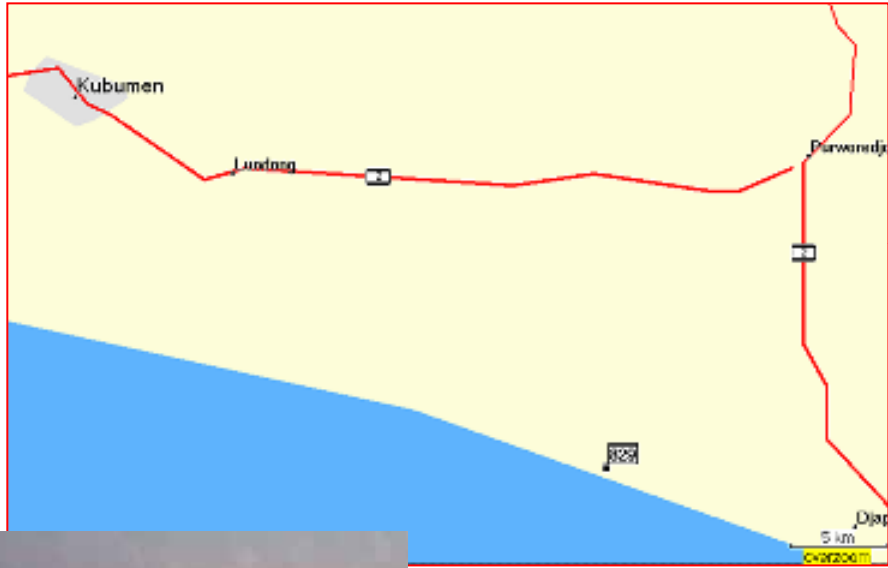


Top of Sandune



*) above Mean Sea Level

Keburuhan - Purworejo



Aprijanto, Suranto, Sujantoko, Zikra, Chaeroni, Widjo K. BPPT&ITS Survey Tim



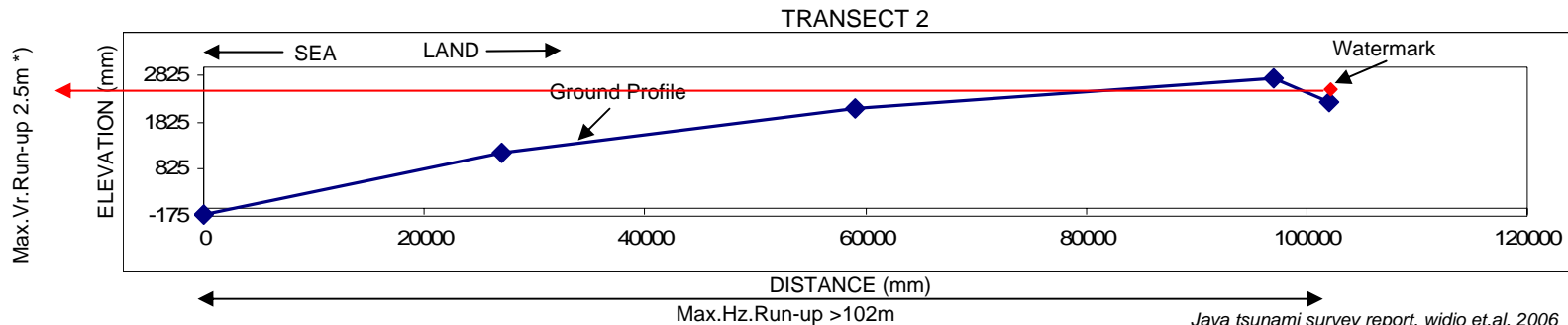
Fisherman Boat 50m Inland



Beachsand Deposit 17cm

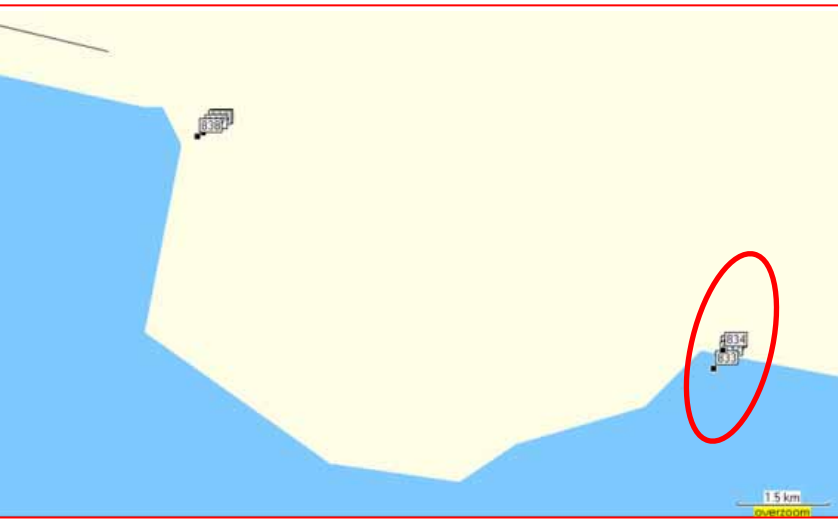


Watermark on the Wall 28cm

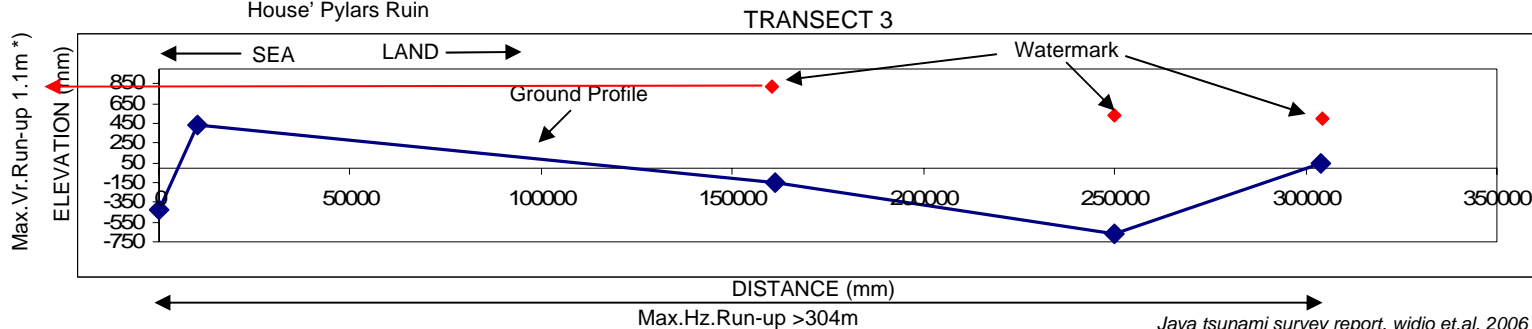


*) above Mean Sea Level

Suwuk - Kebumen



- Weak shaking, heard explosions before tsunami
- Receding wave more than 100m
- 3 waves came, 2nd was the biggest



*) above Mean Sea Level

Ayah - Kebumen

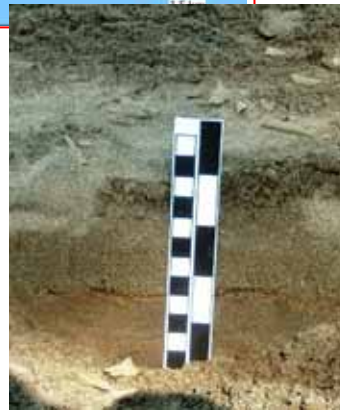


Fisherman Boat 75m Inland



Serka Suwanto & Sertu Naswan, at Naval Base, Ayah:

- No shaking or Slightly shaking
- 4-5 waves came, 1st was the biggest
- 1st wave came 45 min after earthquake time
- Hear twice explosions before wave coming
- 25 cm of tsunami deposit on the office floor
- Escaped to the hill
- Has'nt knowledge of tsunami



Tsunami Deposit 4.5 cm



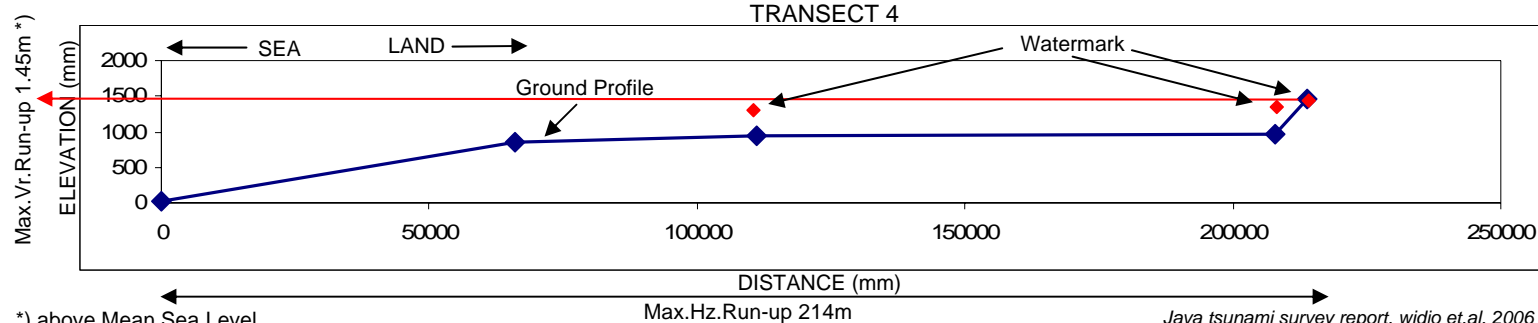
Watermark on the Wall 40cm



Watermark on the Table 40cm



Tsunami Deposit 3.0 cm



Widarapayung - Cilacap



Beach Swimming Pool Ruins



Tsunami Reached >250m of River Inland



1.6m Scoured by Tsunami Turbulence



Beach Profile Leveling



Debris on the trees



Watermark on the wall

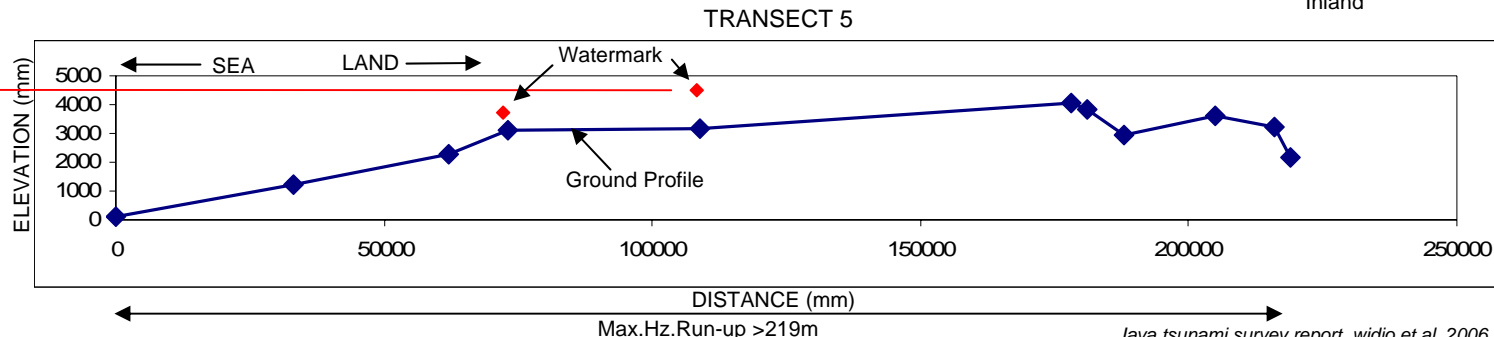


Tsunami Reached >250m of River Inland



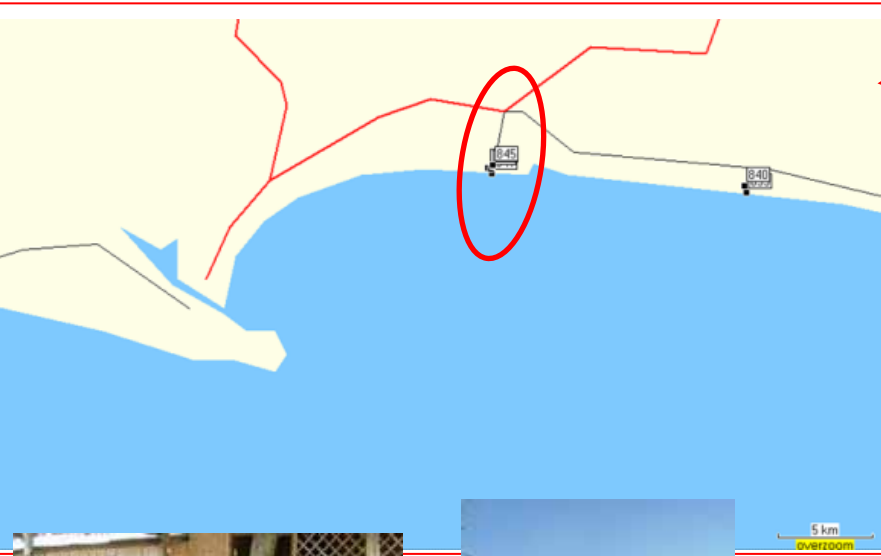
Shelter Toppled by Tsunami

Max. Vr. Run-up 4.58m *)



*) above Mean Sea Level

Bunton - Cilacap



Iron Mining Area up to '98



Debris on the Trees 75cm



Debris on the Trees 40cm



Debris on the Tree 75cm

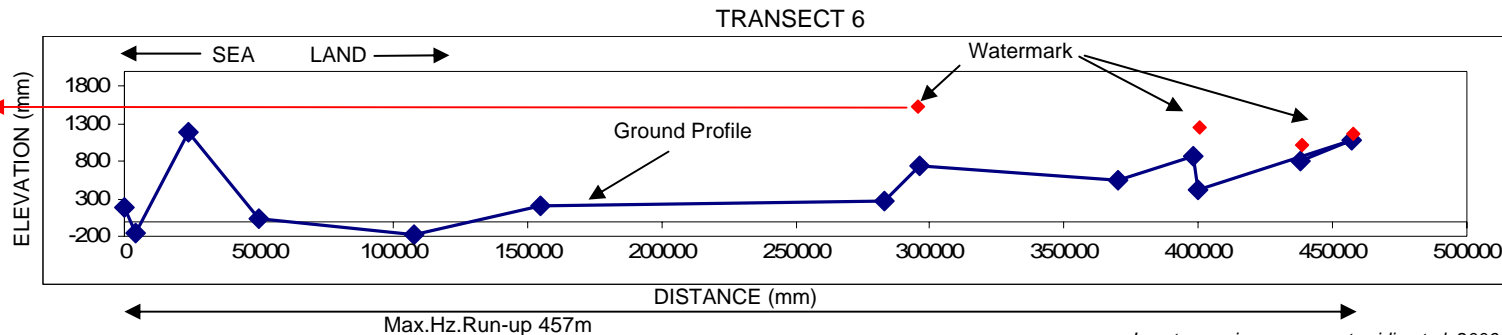


Watermark on the wall 10cm

Mariato, Seller (warung),
Bunton:

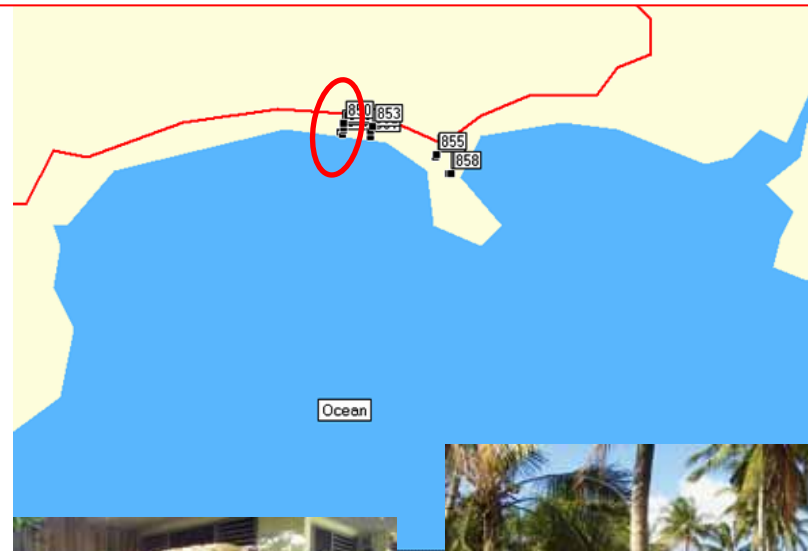
- High waves (~5m) but breaking into 1-1.5m small waves
- 2 waves came, 1st was the biggest
- 1st wave came 50 min after earthquake time
- Explosions were not heard before wave coming

Max.Vr.Run-up 1.48m *)



*) above Mean Sea Level

Cikembulan 1 - Ciamis



Interview with survival



Debris at Cikembulan



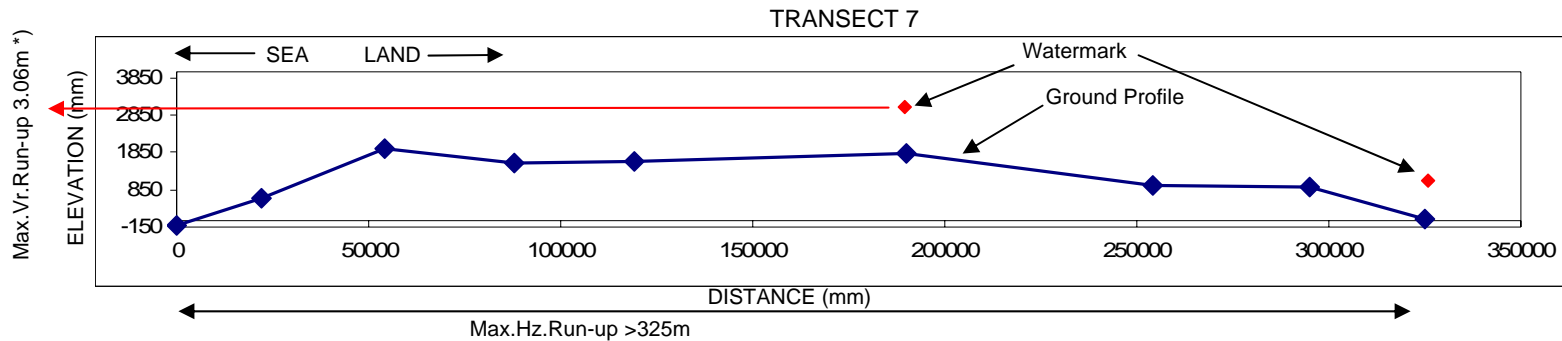
Ground Profile Leveling



Watermark on the wall 90cm

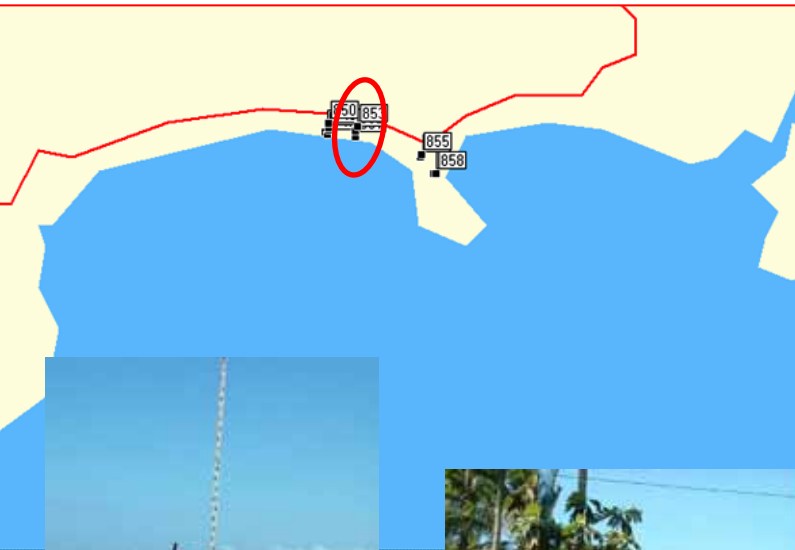
Annameous, Citizen, at
Cikembulan:

- Wave came 16:15 (55 min after earthquake time)
- Some explotions before wave coming



*) above Mean Sea Level

Cikembulan 2 - Ciamis



HWL Points Leveling



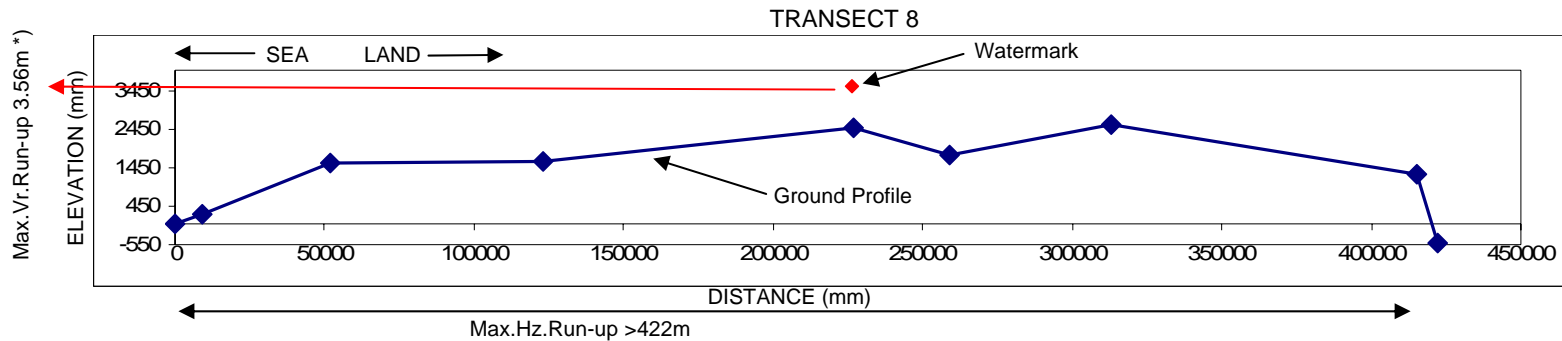
Debris at Cikembulan



Watermark on the wall 70cm

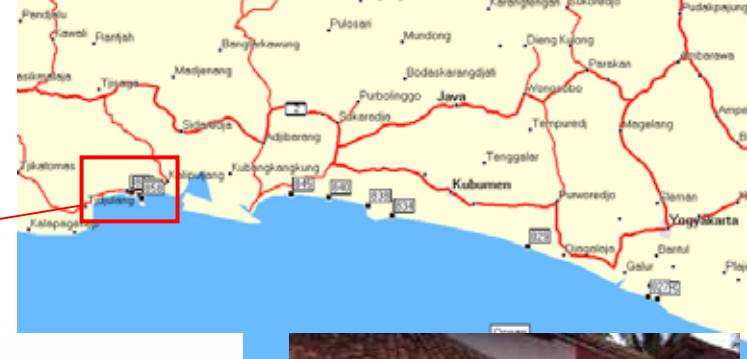


Damaged House



*) above Mean Sea Level

Pengandaran 1&2 - Ciamis



Collapsed Wall



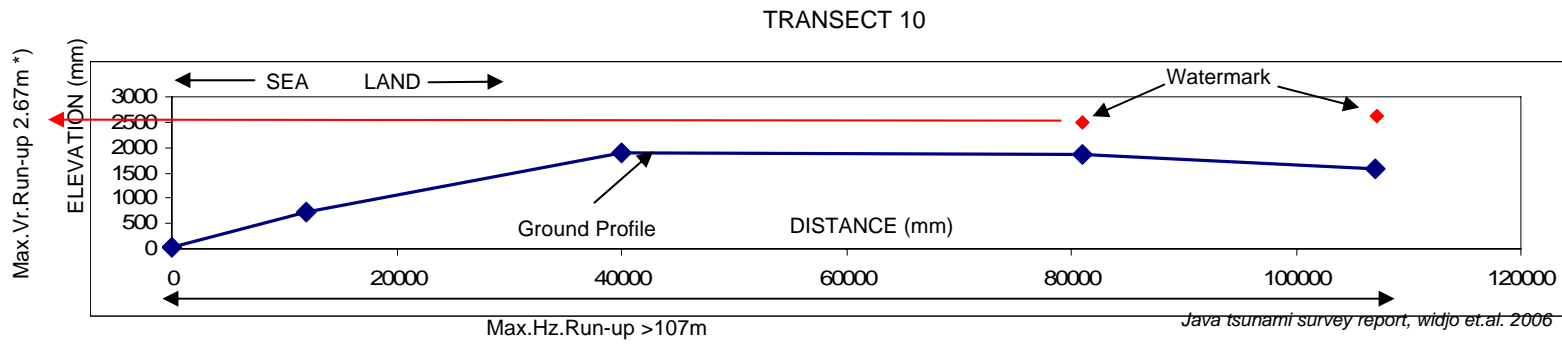
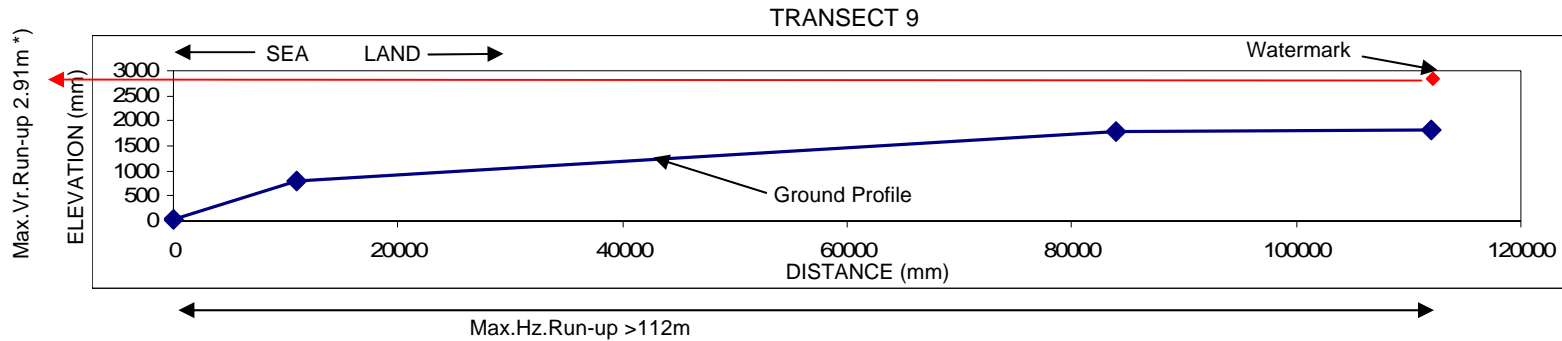
Flattened Shelters on the beach



Boat on the top of pilar



Watermark 70cm on the wall



*) above Mean Sea Level

Tide charts

Tide Constant of Cilacap

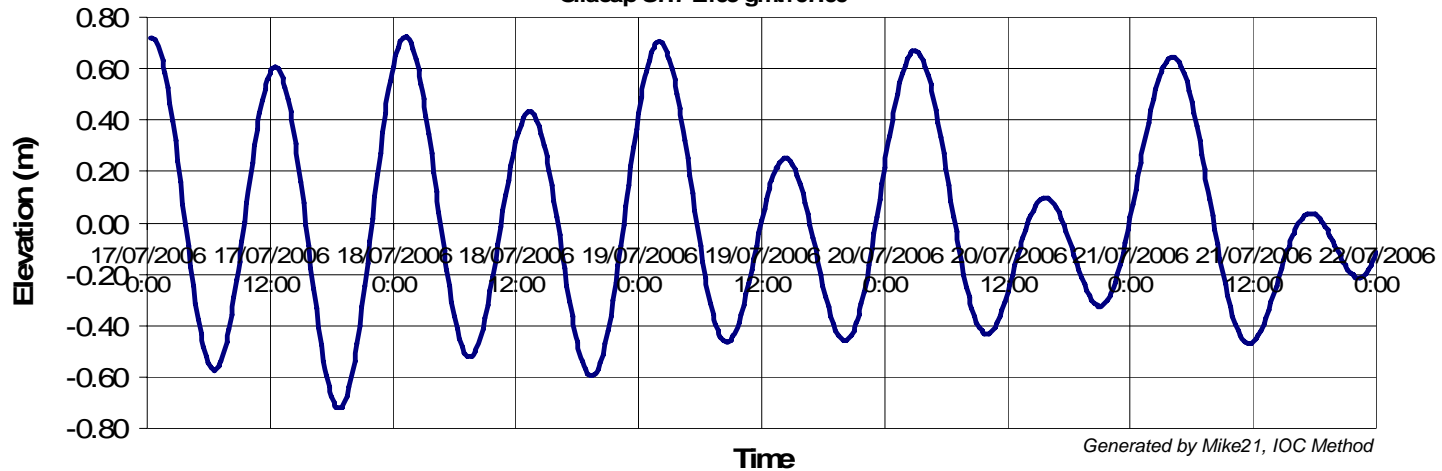
7.7deg South ; 109.0deg East ; Time GMT +07:00

Const	M2	S2	N2	K2	K1	O1	P1	M4	MS4	Z0
Amp (cm)	50	25	10	7	19	12	5	-	-	110
360-g (deg)	125	57	154	56	85	103	90	-	-	-
g (deg)	235	303	206	304	275	257	270	-	-	360

(Source 2005 Tide Tables DISHIDROS)

Tide Chart Prediction

Cilacap S7.7 E109 gmt+07.00



Generated by Mike21, IOC Method

Tide charts

Tide Constant of Benoa

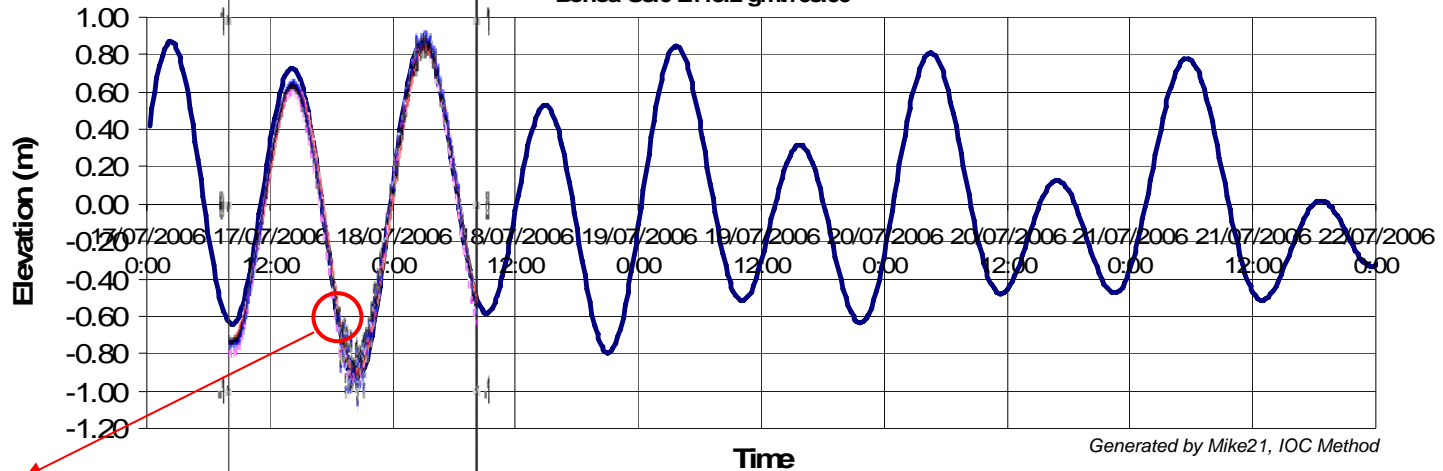
8.7deg South ; 115.2deg East ; Time GMT +08:00

Const	M2	S2	N2	K2	K1	O1	P1	M4	MS4	Z0
Amp (cm)	71	33	-	10	25	12	7	-	-	130
360-g (deg)	113	5	-	5	59	84	59	-	-	-
g (deg)	287	355	-	355	301	276	301	-	-	360

(Source 2005 Tide Tables DISHIDROS)

Tide Chart Prediction

Benoa S8.0 E115.2 gmt+08.00



Tsunami Arrival Time at Benoa
Approx. 18:00 WITA or 17:00 WIB
(1 hour 41 minutes of Traveling
Time)

Benoa 8.7S 115.2E

Courtesy Luhut P.

Map & Its Tsunami R.up Height



Resume

- Rapid survey on Tsunami Java 17 July 2006 has been carried out which consists of 38 points of GPS record, 10 transects, 11 tsunami run-up heights, and several eyewitnesses' interview
- The maximum tsunami run-up is 1.6m, 3.4m, 2.5m, 1.1m, 1.45m, 4.6m, 1.5m, 3.1m, 3.6m, 2.9m, and 2.7m for Parang Endok, Parang Kusumo, Keburuhan, Suwuk, Ayah, Widarapayung, Bunton, Cikembulan 1&2, and Pengandaran 1&2 respectively.
- The tsunami inundation is 250m, 80m, >102m, >304m, 214m, >219m, 457m, >325m, 422m, >112m, and >107m for Parang Endok, Parang Kusumo, Keburuhan, Suwuk, Ayah, Widarapayung, Bunton, Cikembulan 1&2, and Pengandaran 1&2 respectively.
- Tsunami deposits were found in Parang Endok (2cm-5cm), Keburuhan (17cm), and Ayah (3cm-4.5cm).
- Based on interview to eyewitnesses, associate with earthquake/tsunami, there was slightly shaking/no shaking, some explosions heard before wave coming, wave was receded 50-100m to the sea, there were 2 - 5 number of waves which the 1st or the 2nd was the biggest one, and 30-55 minutes for tsunami to reach land.
- Costal communities do not know tsunami well, how and what they have to do if the disaster come.
- Tide record at Bena showed, tsunami reached at Bena approx. 1 hour 41 minutes.

Thank you